Graduate Management Project (GMP):

Clinical Practice Guideline Selection, Development, Implementation, and Evaluation

DeWitt Army Community Hospital, Fort Belvoir, Virginia

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Abstract

This paper discusses issues relating to clinical practice guideline development and implementation, and recommends a step by step plan for guideline use in the Department of Defense. Individual clinical expertise and opinion has historically taken precedence over an evidence based approach, which has resulted in large amounts of practice variation throughout the Military Healthcare System. Clinical practice guidelines attempt to reduce this practice variation and improve patient outcomes by using evidence based medicine and identifying best practices. The DoD/VA Low Back Pain Clinical Practice Guideline was utilized as an example of how to select, finalize, implement, evaluate, and adjust clinical practice guidelines effectively. A retrospective review of patient medical records and tracking sheets was conducted to determine if the clinical practice guidelines were being followed, and if the proper referrals were being made. The study found that guideline implementation can be a lengthy process, but once fully implemented, can result in improved outcomes and reduced costs and practice variations. Recommendations are made as to how to most efficiently choose clinical practice guidelines for individual healthcare organizations, how to best prepare for implementation, how to implement, and how to evaluate and continuously improve the guidelines once implemented. The Military Healthcare System can dramatically cut costs, improve access for beneficiaries, and most importantly improve patient outcomes by working together to develop, select, and use numerous clinical practice guidelines. To do so optimally, it is imperative that barriers to implementation, appropriate training, command influence and physician buy in, local guideline requirements, proper metrics, and the most recent medical technology and best practice be considered when selecting, developing, implementing, and evaluating clinical practice guidelines.

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Clinical Practice Guideline Selection, Development, Implementation, and Evaluation

Introduction

Definitions

Clinical Practice Guidelines (CPGs) are statements that are systematically developed to assist health care providers and their patients to select the appropriate health care treatment or option for their specific ailment or injury (Dans, 1994). DL Sackett et al defines CPGs as "user-friendly statements that bring together the best external evidence and other knowledge necessary for decision-making about a specific health problem" (http://medicine.ucsf.edu, 1999). The Institute of Medicine defines them as "systematically defined statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. CPGs convert a large body of knowledge concerning diagnoses, treatments, preventions, and evaluations into a convenient and easily utilized format. They provide clinical advice, and they may take many forms, such as algorithms, computer based protocols, and policy documents" (1990). Other terms utilized when referring to CPGs include: clinical pathways, protocols, practice parameters, decision support rules, algorithms, practice policies, procedures, clinical practice standards, and critical pathways (Leavenworth). The term clinical pathways refer to "a preoperative, operative and postoperative time line protocol of a disease process that involves services and personnel responsible for the patient's care. This includes the primary care physician, specialist or specialists, clinical resources, clinic and hospital nursing, physical therapy, occupational therapy, laboratory, radiology, and facilities to which the patient may be transferred following complete or partial recovery." (Weiland, 1997) Pathways are "optimal sequencing and timing of interventions for a particular diagnosis" (Henning, 1997) developed by members of the hospital staff. They can be

conceptualized as a series of linked practice guidelines. Guidelines offer suggestions or recommendations to providers who must still decide on the appropriate treatment, whereas pathways focus timelines of care after the decision is made (Pearson, 1995). A clinical pathway that includes outcome data allowing for the analysis of the treatment is called a Care or Multidisciplinary Action Plan. The term protocol is often used in lieu of guideline, but is often more specific. Practice parameters include a variety of numerical characteristics of a population, and are used predominately by the American Medical Association. Practice policies are policies of major health care organizations that dictate the proper procedures for treating specific conditions. Critical pathways are more locally developed, and are hospital specific, detailed plans of patient care to be followed by all healthcare providers and hospital staff for specific diagnoses. A procedure is usually a set of steps that has a narrower scope than a guideline. Standards have a broader scope than a procedure and a CPG. Clinical Practice Guidelines ensure predictable and consistent quality of care, improve research utilization, assure that the appropriate amount of care is given, prevent errors, improve resource utilization, ensure accountability, guide learning, and stimulate research (LTC Dolter, 1998). They are excellent tools to improve patient outcomes, and better use limited healthcare resources. Guidelines are developed by multidisciplinary experts in the field or fields involved in the specialty or specialties that treat patients with certain diagnoses. An example of how effective CPGs can reduce the cost of healthcare is when the American College of Cardiology published pacemaker use guidelines in 1984 that resulted in $750 million of savings to Medicare due to reduced number of pacemaker insertions over the next four year period (Dracup, 1996). They are usually developed by committees or teams that often disperse once the guideline is complete (Weiland, 1997). They can reduce test duplication by identifying optimal testing and eliminating those tests that have no documented benefit. Guidelines can

range from one simple statement, such as “all women over age 40 without a history of family breast cancer should have a breast examination annually”, to somewhat lengthy and complex algorithms and processes (Dracup, 1996). Regardless of their length, they should be limited to major decision points or they may become too complex to use effectively. Guidelines for simple (Eddy, 1990) and complex (Eccles, 1996) guideline development exist to guide the process and CPG methodology for development.

Clinical Practice Guideline History/Factors leading to CPG use

The Omnibus Reconciliation Act of 1989 established the Agency for Health Care Policy and Research (AHCPR) to be responsible for developing clinical practice guidelines, and monitoring the effectiveness of health care (Woolf, 1990). The AHCPR utilized multidisciplinary expert panels to conduct research and to develop clinical practice guidelines for several conditions (Beyea, 1998). The AHCPR developed 19 guidelines in the first seven years of its existence. Guidelines are developed by other organizations as well, such as state medical societies, individual hospitals, the Department of Veteran’s Affairs, and the Department of Defense. The American Nurses Association has also published its own CPGs (Dracup, 1996). The American Medical Association alone had over 2200 practice guidelines in 1997 (Fletcher and Fletcher, 1998). CPG’s have been developed in an attempt to control costs of healthcare, reduce practice variation, and achieve more optimal patient outcomes, as well as higher patient satisfaction with care (Dracup, 1996). Guidelines also support predictable and consistent healthcare quality, assure proper utilization of limited resources, guide learning for healthcare providers, and stimulate and improve research. They lead to continually improving and advancing medical technologies and procedures, which benefits all of mankind.

Guidelines are expensive to develop, but can significantly reduce healthcare expenditures. Each AHCPR guideline cost approximately one million dollars to develop, but can save billions of dollars over time, if broadly implemented. Evidence shows that there may be a large number of operations that are performed unnecessarily (Weiland, 1997). It is hoped that guidelines will result in reducing the number of unnecessary operations and procedures. Guidelines also came about to establish improved methods of measuring outcomes, and to determine what procedures had the best outcomes. Outcome research was necessary for HMO's and other managed care organizations to prove their cost effectiveness, and for them to survive. To survive and thrive in today's health care environment, it is more important than ever for health care organizations to select the most cost-effective procedures, and to continuously monitor and improve them along with advancing medical technologies. Guideline development is moving away from being based on expert opinion, and is now focusing on a "systematic review of evidence" showing the effectiveness of various treatments using scientific evidence (Fletcher and Fletcher, 1998). This focus results in proven treatments, with "best practices" being statistically shown to be effective. Defense Health Care Systems must work together to develop the optimal Clinical Practice Guidelines that can be used universally between services to achieve optimal results, and to best serve its beneficiaries. In October 1999, the Army Surgeon General, LTG Ronald R. Blanck said the following regarding CPGs: "We are placing great emphasis on use of clinical practice guidelines where they are appropriate. Variation is the enemy of quality. Clinical guidelines identify the best way to address conditions that lay out procedures for providers, making the best way the easiest way. DoD and the Department of Veteran's Affairs are cooperating to develop guidelines for the federal system." (The Mercury, 1999). The Army Medical Department has led a Triservice effort to develop a CPG automation support tool within CHCS II. The demonstration ran from the 21st of June 1999 to

September 1999. Lessons learned are being studied, and the CPG tools are to be included in increment 2 of CHCS II. Utilizing standard information technology across the three services will assist in creating a uniform, optimized standard of care for DoD beneficiaries.

DeWitt Health Care System History/Background

The DeWitt Health Care System (DHCS) is a key component of the Integrated Walter Reed Health Care System (WRHCS). The DHCS consists of a community hospital located on Fort Belvoir, and several primary care clinics located in surrounding communities to offer more convenient access for patients. There is a Family Health Center in the main hospital at Fort Belvoir, one at Fort Myer (Andrew Rader Clinic), a Family Health Center in Woodbridge, one in Fairfax, a primary care clinic at Fort A.P. Hill, and one on the South Post of Fort Belvoir. The mission of the DHCS is to provide primary care and designated specialty care as part of the Walter Reed Health Care System; to provide our beneficiaries with ready access to quality, comprehensive and cost competitive care; to maintain and improve individual and collective readiness in support of national security objectives, and to support medical education and clinical research. The DHCS vision is "to be the healthcare system of choice for the Department of Defense beneficiaries of Northern Virginia", and to be "friendly, accessible, and responsible to our military family, ready to support contingencies and mobilization, and accountable to our patients, the Army, and the American people". The DeWitt Army Community Hospital is currently a 60 bed facility with primary care services as its' core business units. The DeWitt Health Care System consists of over 1300 staff members (approximately 1/3 military, 1/3 GS civilian, and 1/3 contract) serving over 135,000 beneficiaries with a $65 million plus budget. DeWitt provides care to approximately 1/3 of all eligible beneficiaries in the National Capital Area, and serves to support all surrounding DoD healthcare facilities.

The hospital was built in 1957 and the physical plant is one of the oldest in the Department of Defense Inventory. The hospital is continuously renovating to improve its' facility, plant, and equipment, however signs of the aged building are evident. To compensate for its' aging infrastructure, it is imperative for DeWitt to ensure that their beneficiaries receive the highest quality care, with acceptable access, and at a reasonable cost. As part of this effort, the hospital has implemented several clinical practice guidelines, and plans to implement several more in an attempt to minimize practice variation and maximize the effectiveness of patient outcomes. In an era of managed care and enrollment based capitation, it is necessary for health care facilities to find more effective ways of doing things. The Iron Triangle of Healthcare (Access, Quality, and Cost) is addressed by the implementation of clinical practice guidelines. The additional aspects of healthcare (politics and ethics) are also considered in CPG implementation. Optimally, guidelines help to improve access by minimizing repeat procedures and visits, and allowing efficient use of time with patients. Effective CPGs should also stress prevention and patient education, which will reduce the incidence of disease or injury. Quality is improved along with patient outcomes, as physician practice variation is reduced, and costs are lowered as more preventive services and early detection are stressed as part of the practice guidelines. Politically and morally (ethically), these affects are also desired and sought after. Patient satisfaction can be improved by CPG use, and CPGs have the potential of allowing the "greatest good for the greatest number" of beneficiaries.

Conditions Which Prompted the Study

. The DeWitt Health Care System currently has several Clinical Practice Guidelines at various stages of development and implementation, including: Hypertension, Well Child Care, Hyperlipidemia, Low Back Pain, Asthma, Diabetes, Acute MI, and Depression (see Appendix D for a complete list of

current and proposed clinical practice guidelines). The system selects Department of Defense (DoD), North Atlantic Regional Medical Command (NARMC), and Health Plan Employer Data and Information Set (HEDIS) developed Clinical Practice Guidelines for implementation. It is much easier to select pre-existing and pre-tested and approved clinical practice guidelines, than for a single hospital or health care system with limited resources and personnel to develop new ones of their own. A clear methodology or process to determine how clinical practice guidelines are selected, developed, implemented, and evaluated could be advantageous to all Department of Defense and Veterans Affairs health care facilities. The Performance Improvement Committee tracks their progress, and each has an assigned "champion". A standardized Clinical Practice Guideline operating procedure will be very useful in choosing which guidelines to implement and how to measure them. One of the most important steps is the selection and timely and effective implementation of the guideline. Following selection, staff and patient education, monitoring of outcomes and other CPG metrics, as well as continuous reevaluation and improvement is necessary to ensure the most up to date and effective CPGs are being utilized.

Statement of the Problem or Question

How can hospitals and medical centers develop a clinical practice guideline process to determine what diagnoses lend themselves to CPG implementation, what CPG's should be selected, how should they be implemented, and how should they be evaluated, and monitored? How can proper metrics be developed to determine CPG effectiveness? A study must be done to determine a Clinical Practice Guideline process that should be followed. Such a process would simplify the use of Clinical Practice Guidelines, and may assist in national or global CPG development to optimize patient outcomes

and improve overall health. The Low Back Clinical Practice Guideline is a good example of the process for CPG adaptation, and will be utilized in this paper as a model to apply the CPG process.

Purpose

The purpose of this graduate management project is to seek to develop a system or methodology for selecting, developing, implementing, and evaluating clinical practice guidelines. The DoD/VA Low Back Pain Clinical Practice Guideline is used as an example for how the process works. This paper also seeks to serve as a information source specifically for the VHA/DOD LBP CPG, and generally for all clinical practice guidelines. There are numerous articles and studies that have shown that clinical practice guidelines can improve the quality of care and reduce the costs of healthcare.

Literature Review

There is abundant literature on clinical practice guidelines and clinical pathways. Numerous studies have been done concerning their development, implementation, evaluation, and their impact in healthcare organizations. One of the first steps in identifying a disease or injury that indicates CPG use is to research the costs of the disease or injury to society. Using low back pain as an example, the research proves that musculoskeletal injuries due to repetitive motion injuries, or cumulative trauma disorders, result in lost workdays, reduced productivity and increased health problems and costs. Low back pain affects up to 80% of the adult population at one time or another, and is the third most common reason for patient visits (http://www.orthospine.com, 1999). Such research can be done for any diagnosis to see if CPG application may be advisable and "worth while". Acute low back pain is prevalent in much of the U.S. population, and is one of the most common causes of disability in those under age 45. Low back pain is an extremely costly to our nation as whole, both in terms of personal discomfort and in lost productivity and medical expenses. The average cost of back surgery is

$180,000, with a total estimated cost to the U.S. in 1986 of 11.1 billion dollars, comprising over 40 percent of all worker's compensation costs in that year (Journal of Occupational Medicine, 1990)! The disability rate from low back pain increased fourteen percent quicker than the population growth rate in 1993 (Smith, 1995). Low back pain is obviously an excellent example of a frequently occurring medical condition that lends itself to Clinical Practice Guideline use. CPGs for low frequency diagnosis, unless the procedures involved are extremely costly (high cost DRGs or ICD 9 procedures) are not usually beneficial in terms of cost, but may still be useful in terms of improved patient outcomes. There are many related areas that must be considered when looking at a CPG process. Obstacles to implementation, desirable CPG attributes, JCAHO and other regulatory agency requirements and standards, selection criteria, illness etiology and epidemiology, illness specific treatments, and preventive medicine and education must all be considered when developing a complete continuum of care, "cradle to grave" CPG process.

Clinical Practice Guideline Barriers and Obstacles

Despite the pressure towards implementing Clinical Practice Guidelines, there are numerous obstacles to their implementation, including concerns of credibility. Many researchers have determined that support for CPGs is lacking. Incentives for the use of guidelines are necessary if they are to be rapidly accepted and utilized (Lomas, 1989). A study by Kent, et al in 1994 determined that only approximately 50 percent of reported guidelines were credible (Kent, 1994). In many instances, health care providers only trust guidelines developed by their own organizations, or by national organizations. Trust, or lack of trust, is a major factor involved with CPG "buy in". If providers do not trust the source of a CPG, then they are very unlikely to adopt and follow such a guideline. With so many different guidelines, it is inevitable that some contradict one another. This causes additional loss of trust in CPG

use. As an example, in 1997 two government agencies issued opposing guidelines on mammography screening for women over the age of 40 (Eastman, 1997). To be successful, a guideline must be carefully developed by including all of the current knowledge regarding the diagnosis and treatment of the specific condition being considered. National or international Process Action Teams may be a way of developing the best possible guidelines. The Department of Defense has its own experts that can design state of the art, optimal CPGs for DOD use. Another major obstacle to the adaptation of CPGs is their timeliness. It is difficult to keep CPG's current and up to date with the most modern clinical knowledge. The rapid rate of change and advancement of medicine makes it challenging to ensure that CPGs keep up with these changes. It can sometimes take years for CPGs to be created, and they must be a "living" guideline that is updated periodically along with technological advances and changing medical practices. The CPG process must include semiannual or annual review of CPG effectiveness, and review of changes in the standard of care. Another barrier to CPG acceptance is medical liability. Some studies have found that CPGs actually reduce the likelihood of liability, while others have found the opposite to be true. A Massachusetts study found that malpractice insurance premiums for anesthesiologists were reduced by 20% when they followed general anesthesia guidelines. Compliance with CPGs can be utilized as a defense to malpractice claims and other litigation. As long as the CPG is followed, then it is very likely that a court of law will determine that the standard of care has been met (depending on the scope and source of the guideline being followed.) On the other hand, a Harvard School of Public Health Study found that guidelines were three times as likely to be used against doctors as opposed to in their defense. It must be remembered that "guidelines" are just that. CPGs should not be "cook book medicine", but a guideline with parameters for health care providers to follow.

Another difficulty in implementing CPGs is the lack of outcome measurement and statistical evidence supporting or refuting better patient outcomes. It is necessary for CPG outcome metrics to be monitored and reported so that it can be determined how well they are working. Some CPGs lend themselves to easily monitored and quantifiable metrics (such as the Hypertension Clinical Practice Guideline and systolic and diastolic blood pressure readings), while others (such as low back pain) do not. Without meaningful metrics, CPG effectiveness cannot be accurately determined, and improvements become difficult to make. It also takes a long period of time to see the effects and the savings of most Clinical Practice Guidelines. Patience is necessary to allow enough time for the CPG to take effect.

In addition to these obstacles, it is very difficult to get all health care providers on "the same sheet of music". Providers are trained to do things differently, and it is difficult to get them to change. Providers have different cultures, customs, and habits, as well as training. In a speech to Robert Wood Johnson Grant recipients in 1991, Dr. Brent James said that: "while twenty percent of medicine relies on research, as much as eighty percent is still based on tradition and opinion. Tradition and opinion is the clutter that is encumbering safe and productive outcomes in health care today." Care based on opinion is usually not optimal care, but care based on proven empirical evidence usually is. Due to opinion, some patients receive inappropriate care, while others don't receive necessary care. Medical School education is key to preparing students to adopt similar practice patterns. Once national CPGs are developed, they should be standardized to guide everyone to follow the same procedures. Standardized CPGs would also eliminate the problem of conflicting guidelines that prescribe different procedures or processes. It is important that CPGs not act as blanket recommendations for all patients, but allow flexibility to conform to patients' preferences.

A major barrier to CPG acceptance is physician and patient compliance and agreement. Physician adherence, as well as patient adherence and organizational adaptation, is needed for guideline implementation (Cabana, 1992). Providers are more likely to take part in CPGs that they have helped to create, or that they know achieves excellent health outcomes (as shown by historical, accurate statistical measurements). Providers must be made aware of the existence of the guidelines, and must agree with its recommendations if they are to follow them loyally and consistently. With over 4000 professional journals and thousands of clinical practice guidelines, as well as an extremely limited amount of time available for reading, it is difficult for physicians to "keep abreast" of guidelines (Shell, 1998). Guidelines must be readable with a well thought out appearance and format to be quickly understandable. Patients are more likely to accept and comply with CPG directives if they know that metric's have shown them to result in outcome improvement. Asymmetric knowledge is reducing between providers and patients , as patients are utilizing the internet and other information sources to become somewhat knowledgeable regarding their own afflictions. Such knowledge requires CPG metrics to show improved outcomes, and to be accurate and available to patients in order for CPGs to be accepted and followed by them.

One last barrier to CPG adoption is a concern by some clinicians and patients that the CPG will be utilized by third party payers/insurance to refuse reimbursement for certain treatments. Scientific evidence may show that the treatment prescribed by the physician isn't effective, or isn't supported by available evidence, and as a result refuse to cover the treatment. The doctor and patient must then argue their case that the insurer should cover the treatment (Field and Lohr, 1992). CPGs should also not be used as an argument for reduction of research expenditures. It is necessary for research to continuously be funded to search for ways of improving the CPGs effectiveness. Misutilization of CPGs

will result in less providers following the CPG, and will reduce the CPGs effectiveness, and must be avoided by the Department of Defense. CPGs must not be used to reduce budgets or to punish those organizations who save money from their use (through future budget reduction). This will lead to noncompliance with CPG guidance and a ineffective process. A survey of internists in 1996 found that the majority felt that clinical practice guidelines with a concise summary of recommendations, synopsis of supporting evidence, quantification of patient benefit, and endorsement by a reputable organization were factors most likely to result in the adaptation and use of the guideline (Hayward, 1996).

Desirable Attributes of CPGs

It is also important to understand what attributes of CPGs influence their continued use and acceptance. CPG development and implementation is expensive, and if the CPG lacks the desirable attributes, it is likely that the benefits may not overcome the costs of designing and implementing the CPG. CPGs must be valid, reliable, and flexible. The algorithms must be based upon the "best practice" regarding prevention, identification, treatment and cost. In other words, they should come from evidence based medicine. They should have a multidisciplinary approach, involving all those affected by their implementation, and they should have metrics established to measure their success (Bonastia, 1994). To be valid, CPGs must consistently lead to better outcomes at lower costs than other alternative options. Their development must have a strong scientific base. To be reliable, CPGs must be consistently interpreted and applied. If two or more separate organizations develop CPG's for the same diagnoses, and these guidelines are very similar, then they are probably reliable. In the ever-changing health care field, it is imperative that CPGs are flexible enough to keep up with continuous medical technological development. CPGs should also be clearly written and understandable. Algorithms must be kept logical and easy to follow, and should be equally understood in any part of the

nation (terminology should be concisely defined). Documentation of the CPG selection, development, implementation, and evaluation process should be kept to ensure it can be easily reviewed and updated. To be readily accepted, CPGs must reflect current technology and generally accepted clinical practices (evidence-based medicine), or resistance to their use will occur, and they will not be followed. CPGs can't possibly cover every clinical situation for each unique individual patient, but should serve as a general guideline to follow. "A useful practice guideline must walk a fine line between excessive specificity (eg a step by step recipe to be followed in every case) and excessive generality (eg diagnose and treat the depression optimally). The former is dangerous, not supportable by science, and ignores critical individual patient and treatment differences. The latter provides no guidance" (Rush, 1993). Good guidelines don't tell you what decisions to make, but offer a range of options based on the best clinical evidence, the provider's individual judgement, and the patient's values and expectations (http://medicine.ucsf.edu, 1999).

Proposed JCAHO Standards

For the year 2000, JCAHO has added a clinical practice guideline section to it's Leadership Survey Chapter. Hospitals that utilize CPG's will have to be in compliance with these new JCAHO requirements (see Appendix B for the actual JCAHO chapter additions). This is yet another reason that CPGs should be carefully selected and implemented. If they are not, then JCAHO surveys may result in negative findings that could significantly tarnish the hospital or health care system's image, as well as result in unnecessary costs. JCAHO's addition of CPG standards indicates the importance placed on CPG selection and use. When developing a Clinical Practice Guideline, health care organizations need to ensure that JCAHO and other regulatory agency requirements are being followed and met by the guidelines.

Selection of Clinical Practice Guidelines

There are numerous Clinical Practice Guidelines already in existence for dozens of diagnoses and treatments, with more and more CPGs being developed and implemented each year. Choosing the most effective guideline for your organizations needs is paramount if the guideline is to achieve the optimum results. The AHCPR has an Acute Low Back Pain Guideline (#14) that is similar to the DoD/VA guideline, as well as to other low back guidelines in existence. How can you select the "appropriate" one?

The growth of alternative medical treatments for back pain (such as chiropractic and magnets), in addition to wide regional variations in surgery rates and treatments, manifests the lack of consensus on low back pain treatment, and indicates that a guideline for low back pain is sorely needed (please excuse the pun). Guidelines that benefit society as a whole and not just individuals should be sought after and selected for use. One of the goals of medicine is to provide the greatest good for the greatest number. A guideline that helps one group but hurts another by utilizing precious, limited resources should not be selected for implementation. Guidelines that maximize overall cost effectiveness for populations of patients should be selected over guidelines that maximize cost-effectiveness for individual patients. The ideal selection is a CPG that is flexible enough to optimally address both individual and societal health care needs. Choosing a less costly and less effective clinical practice guideline for a condition may allow resources to be utilized for valuable treatments of other less prevalent conditions (Granata and Hillman, 1998). Guidelines for a common disease, that have a range of treatment options or choices available, a large body of scientific evidence on which to be based upon, and practice variation should be considered (Rush, 1993). An effective method of determining which diagnosis may be ideal for CPG use in individual DoD facilities is to use the Corporate Executive Information System

(CEIS) to list the diagnoses with the highest frequency of occurrence and the highest average cost per procedure (see Appendix L for DeWitt Health Care System diagnoses). These procedures often lend themselves to benefiting from the adaptation of CPG use. Another effective method is to compare average length of stay, and cost per procedure to other Military Treatment Facilities (MTFs) (see Appendix M for DHCS compared to The National Naval Medical Center in Bethesda). It is best, in practice, to compare your facility to other like facilities of similar size and a similar scope of practice. Those diagnoses with large discrepancies may benefit from CPG reduction of practice variation, and improved outcomes, as well as reduced costs. It must be considered, however, that a wide practice variation may indicate the need for highly individualized treatment for the particular diagnosis under consideration. Examining the procedures and techniques followed by those DoD facilities with the lowest average length of stay and cost may indicate the most effective treatment methods that can be used for that diagnosis. Once CEIS is centralized and data quality is improved, it should be fairly easy and accurate for the Military Healthcare System to determine what facilities are engaging in the lowest cost procedures, and upon investigation, the best patient outcomes.

The chosen CPG should have a patient guide as part of the education process to facilitate patient compliance with treatment regimes (see Appendix H for Low Back Pain education handout examples). Providers should receive adequate training to follow the CPGs and utilize these patient information guides. This will assist patient adherence and optimize the effectiveness of the CPG. Using the Low Back Pain CPG as an example, it is necessary to have a low back care guide and to demonstrate the guides information to the patient to reduce the likely hood of the patient suffering future back pain, and to expedite the recovery from the current pain. A physician demonstrating proper lifting, bending and sitting, as well as back stretches and exercises, in addition to a guide that effectively

explains and pictures these techniques plays a large part in the patients recovery and in preventive measures of future occurrence.

When developing and/or analyzing clinical practice guidelines, it is important to use a multidisciplinary expert panel that examines and critiques research concerning the targeted illness or injury, completes an extensive review of the published research, and rates the strength of the evidence for each treatment or recommendation prior to including it in the guideline. Conducting a meta analysis of the studies regarding the targeted illness/injury will enable this team to identify those interventions strongly supported by significant statistical outcomes from those based on expert opinion. This is imperative in the development and selection of clinical practice guidelines. It is important to ask these and other questions when considering CPGs to implement in your facility or health care system: How was it developed? Who developed it? Were a systematic process and appropriate methodologies used? Is the guideline practical? Is it cost effective? Is the statistical evidence strong enough to warrant a change in procedure? If implemented, how will the guideline affect operations?

Causes of Low Back Pain

In order to effectively select, implement and monitor any clinical practice guideline, it is necessary to understand the causes, or etiology of the disease/diagnoses under consideration. As an example, there can be numerous causes of low back pain. The precise cause of low back pain is often difficult to determine, and only 20% of patients have their pain attributed to accepted and concisely defined diagnosis (http://www.orthospine.com, 1999). By understanding these causes, preventive medicine efforts, educational programs, and treatment regimes can be developed to prevent low back pain when possible, or to help treat or correct the causes. Poor muscle tone or physical condition, muscle spasms, arthritis, herniation of the nucleus pulposus, muscle tension, back sprains or strains, ligament tears, muscle tears, lumbar spinal stenosis, joint problems, irritated discs, “slipped discs”, improper lifting

techniques, repetitive motions, excess stress, and long periods of inactivity can all lead to low back pain and discomfort (http://www.vh.org/Patients/IHB/Ortho/BackPatient/Causes.html, 1999). In many instances, the exact cause of an individual's pain cannot be determined easily. If a person is sitting improperly at work, or fails to stretch adequately, it is often challenging to gather this information lacking visual observation of the activity. But, understanding some of the causes allows health care professionals to provide preventive medicine information to the patients via direct consultation, handouts, posters, booklets, web pages, magazine and journal articles and other media methods. Providing such information, in addition to offering educational classes, will educate the patient, and address most of the possible causes. In the case of low back pain, education and training can teach patients how to lift properly, sit properly, and stretch properly. If the patient follows the training advice, future incidents of low back pain can be drastically reduced. The best way to treat someone is before the injury occurs. Keeping an injury from occurring saves patients unnecessary pain and suffering, saves hours of lost productivity, and can lead to tremendous health care savings. Considering disease causes is a key element of developing effective clinical practice guidelines.

Various treatment methods for the disease should also be considered as part of the guideline. There are numerous ways to treat various diagnoses and the more that are considered, the more complete the guideline will be, and the more choices the patient will have. Of course, only proven treatments should be included in the finished guideline, but none should be overlooked when searching for the best process. In addition to knowing the causes of a disease and designing patient specific training and education programs, it is also useful to implement staff training and education programs if the hospital work environment includes causal agents of the disease under study. In other words, if your staff is susceptible to the disease due to work conditions, create an in house staff training program. In the case of low back pain, an Ergonomics program, as part of a comprehensive employee safety program can save a health care organization significant sums of money and increase staff productivity levels.

Ergonomics Programs

The science of ergonomics is the study of how laws of nature affect workers in their work environments. In addition to providing patients and staff with low back pain (or whatever the disease may be) information, any healthcare organization should also protect their staff from low back pain by reducing the risks encountered in their work environment. MDW Regulation Number 385-5 prescribes the policies, procedures, and responsibilities for establishing an ergonomics program for the Military District of Washington. Each installation is required to have an ergonomics officer and committee to address ergonomic concerns. OSHA has recently published an ergonomics standard in the Federal Register, which requires employers to address ergonomic concerns. OSHA administrator Charles Jeffress said, "if there are conditions in your workplace that cause multiple stress disorders (MSDs) then you must correct them." In the case of health care organizations, most employees conduct numerous repetitive tasks that may lead over time to MSDs or RMIs (Repetitive Motion Injuries). Hospitals should not only implement such a staff and patient education program due to regulatory requirements, but should do so simply because protecting their workers and beneficiaries is the right thing to do. It will reduce suffering, and save tremendous sums of money that can be utilized in other areas of health care research. Roger Stevens of OSHA predicts that repetitive motion and back injuries may account for approximately fifty percent of all workers' compensation costs by the year 2000. This is an astronomical cost to the United States. Nearly two thirds of the occupational illnesses reported in 1994 were due to repetitive trauma, and it continues to increase (Bureau of Labor Statistics, 1995). Upper extremity cumulative trauma disorders cost the United States over $560 million dollars a year (Journal of Occupational Medicine, July 1994). Effective ergonomics programs in addition to the use of Clinical Practice Guidelines can reduce the costs of such disorders dramatically by prevention, early diagnosis and treatment, and education.

Industrial hygiene issues and RMIs were identified as significant sources of occupational injury and disease over 300 years ago by Bernardino Rammazzini (the Father of Occupational Medicine) (Margolis, 1975). The cause of these RMIs was determined to be unnatural and irregular postures and motions, and extreme exertion of force or pressure. Everyday activities cause wear and tear on our joints, tendons, muscles, and nerves that in turn causes fatigue and eventually RMIs to develop. RMIs result in pain and stiffness of the fingers, hands, wrists, forearms, back, neck, and other joints. There can be numbness, loss of strength, and even crippling. Some disorders resulting from repetitive overuse, overexertion, and excessive stress include tendonitis, neuritis, carpal tunnel syndrome, cubital tunnel syndrome, and bursitis (Burke 1992). There are numerous diagnoses that can be attributed to such conditions, with one of the most common being lower back pain. Probably up to 80% of all people will experience lower back pain at sometime during their lives. Studies have shown that 1 in every 25 people will change their careers due to such pain. (Moore, 1992)

The goal of an ergonomic program is to study work activities, then design the work place tools, equipment, and overall environment to prevent these injuries, and improve effectiveness. The human body is not designed to sit for long periods of time, even in ergonomically designed chairs. Since 70% of the American workforce now sits on the job, it is imperative that ergonomic plans are in place to reduce neck, shoulder, back, and eyestrain. Over 1,400 days of work are missed for every one thousand workers due to back pain (Federspiel, 1989). Estimates of the total annual cost of back injury and pain in the United States range from 50 to 100 billion dollars (Frymoyer, 1991). Up to 25% of all worker compensation claims are due to back pain (Shi, 1993). This constitutes a huge cost to society. There are numerous methods for controlling this strain in the workplace. (Kome, 1999) Allowing workers to periodically stop work and stretch will reduce likelihood of repetitive motion injury. Providing job variety or job rotations will allow use of different muscle groups, which is also beneficial in repetitive work. Utilizing robotics and machines for repetitive tasks as much as possible is also helpful in reducing employee injury. Supplying the proper ergonomically sound chair and equipment also reduces injury substantially. When new furniture or equipment becomes necessary, order ergonomically designed replacements. The money saved will make the equipment pay for itself in no time. It is also

important to make work as "even" as possible. In other words, try to keep work constant and not extremely busy at some times and not busy at others. One last method of reducing injuries is to provide time, and if possible the equipment and facilities for workers to work out before, during, or after the work day. By keeping worker's muscles strong, many injuries are preventable. The Department of Defense's focus on physical training is an excellent way to keep soldiers, airmen, marines, and sailors fit and healthy.

The costs of RMIs and other musculoskeletal disorders and diseases to the Military Healthcare System are great. The direct effects on operations are to reduce worker output, damage plant and equipment, result in poor patient outcomes, lead to inability to meet work demands, and result in poor customer service and satisfaction. Overmanning of the hospital can occur, as additional staff are necessary due to high number of absentees, and missed work days due to injury. This can be true with any disease or injury that affects the staff. When a hospital worker is absent, the cost is great in terms of benefit payments, training of replacement workers and hiring of additional staff. Recruiting and training costs are high due to personnel turnover. Increased insurance due to litigation and expensive health care costs tremendous amounts of money. Every minute of absenteeism, error in data entry, and dissatisfied worker who leaves the company due to RMIs costs money, and impedes operations. If a military hospital, or any federal building for that matter, is poorly designed in regards to ergonomic considerations, then there is an increased potential for accidents, increased risk of turnover, higher rate of absenteeism, increased training costs, and usually reduced job satisfaction (Eastman Kodak, 1986).

It is imperative for hospitals to ensure that ergonomics/human factor engineering is considered when facilities, medical devices, technology, and workstation equipment are designed and built. It is the responsibility of managers to address ergonomic hazards in the workplace, and ensure ergonomic training programs are implemented. Proper utilization of ergonomics will result in minimized human error, easier use by operators, optimized flow of information, and reduced risks of injury. New OSHA regulations on ergonomics programs must be adhered to across the United States, not only in the DoD. It is important when considering programs to implement in support of the clinical practice guideline goals, that OSHA and other regulations in addition to JCAHO be considered. The CPG programs

must be in compliance with pre-existing regulations and laws.

An ergonomically designed hospital will: increase productivity, decrease turnover, injuries, absenteeism, and accidents; lower medical costs, repair and replacement costs, and operation costs; and result in a more efficient, effective, and friendlier work environment. "Do no harm" is one of the basic tenets of modern medicine. To achieve this tenet, technological advances require that health facility planners and designers utilize ergonomics when designing and constructing facilities, equipment, and the overall work environment. It is imperative to the success of any ergonomic system or program, that the program has command emphasis. Command emphasis is usually lacking, resulting in reduced ergonomic usage, and reduced organizational operational efficiency. Strong leadership support will result in optimal ergonomic utilization and optimal hospital operational effectiveness. This, in turn, will result in less cases of low back pain in DoD employees. Of course, not all instances of low back pain can be eliminated through prevention, so in many cases, treatment will be necessary for staff and patients. Certain treatments are ideal for certain illnesses/injuries, as well as for individual circumstances.

Treatment of Back Pain

When preventive measures fail, there are several proven and effective treatments for low back pain as for most diagnoses. For mild to moderate back pain, over-the-counter (non-prescription) medicine such as acetaminophen, aspirin, or ibuprofen is usually effective in granting relief from pain, with minor side effects, and minimal cost. Not all patients can take these medicines, as some will have stomach irritation or ulcers from aspirin or ibuprofen. Many prescription medicines for low back pain can cause drowsiness (such as muscle relaxers), so care must be taken to individually tailor the medication to the individual's specific circumstances. In addition to these pain relievers, cold packs may be effective within the first 48 hours of the first onset of back pain. Applying cold (in the form of ice or cold packs) for 5 to 10 minutes at a time should help relieve swelling and pain. Following 48 hours, warm compresses may assist in circulation improvement and reduction of pain. Spinal manipulation and

chiropractic adjustments are often effective for “adjusting” the spine, and relieving back pain and pressure. Every patient is different, and individual programs must be tailored to their needs. Other treatments include bed rest, traction, transcutaneous electrical nerve stimulation, massage, biofeedback, acupuncture, injections into the back, back corsets, stretches, ultrasound, physical therapy or surgery. These treatments vary in expense, and in effectiveness. Most treatments for low back pain only give relief from pain, but do not guarantee a speedy recovery or help keep acute back problems from returning.

When developing a clinical practice guideline, brainstorming or mindmapping the disease, illness, or injury is beneficial to identify all aspects of consideration. This should result in a more complete, holistic, and effective guideline. In the case of low back pain, patient education is key to a successful reduction in the number of new low back dispositions.

Patients should be informed that they should make some changes in their activity levels when they experience low back pain. They should avoid heavy lifting, lifting when twisting, bending forward or reaching, and sitting for long periods of time. Proper lifting techniques can be demonstrated right in the exam room, in addition to “office” stretches, and other preventive actions. Patients should be told that wearing comfortable low heeled shoes is helpful in reducing back strain. Their education should include the use of a lumbar roll when driving long distances. Sleeping on the side with a pillow between their knees will also reduce back strain. An exercise program is also an integral part of the treatment for low back pain, as well as numerous injuries and illnesses. Each patient needs an exercise program that they will be able to follow, and one that is easy for them to do. It is very difficult in today’s healthcare climate to spend enough time with a patient to adequately cover all of the necessary education and training that they need. Low back pain handouts (such as those found in Appendix H) can be used to

simplify for patients what exercises to do, how their workspace should be established, and how they should sit or lift. Such information handouts can be designed and updated for all diagnoses. The patient must be questioned on following visits if they have been following the handout instructions, and may be asked to demonstrate proficiency in completing the tasks. Short questionnaires can also be given as the patient is waiting in the waiting room for their appointment, or mailed to them ahead of time to fill out and bring with them. This will enable the physician to better utilize the 15 minutes or so that they have for each patient, and to have more time with the patient tailoring an individual treatment plan.

The Internet is also an invaluable patient resource for health information. The Agency for Health Care and Research (AHCPR) and numerous others have free low back pain education web sites that can be advertised by physicians to help patients educate themselves. Providers must ensure that the web sites they give out are accurate and up to date, and helpful to the patient.

Outcomes Management

In order for a clinical practice guideline to be successful and worth the costs of implementation and monitoring, it must be able to show improved quality of care and reduced costs through outcomes data and management. One of the main challenges of CPG development and measurement is to accurately measure the strength of the evidence of effectiveness in relation to costs that the CPG achieves. To determine what is being done well and what could be done better, it is necessary to research outcomes data of different organizations, and compare it to your own. The military health care system needs to be able to sell itself as an effective system to the American people and to Congress. To do this, it is extremely beneficial to be able to show that the system has identified and adopted the "best practice" currently used in the world today. Outcomes Management can be applied to many diseases, if not all to one degree or another. As a part of the clinical practice guideline selection

process, it is helpful to look for outliers. Physicians or hospitals with extremely good and extremely bad outcomes for the disease being considered (Bijlefeld, 1999). By examining available patient and treatment data, it can be determined why outlying outcomes were so effective, and if they should be adapted as the "best practice". The current shift is from traditional utilization management techniques to complete disease management. "Attacking" a disease from all perspectives, to include prevention, education, nutrition, exercise, early detection, and treatment, will enable the DoD to develop complete "Assault" plans for specific diseases that will have a tremendously positive impact in many areas. Improving the quality of patient care by improving outcomes, coincidentally, in most cases also reduces costs through less use of health care assets. "The outcomes approach also should save lots of money. Kaiser Foundation Health Plan and Hospitals CEO David Lawrence cites studies that claim the United States could cut its medical costs by 30 percent, or $33 billion, if widely accepted best practices were applied across the nation." (Bijlefeld, 1999). It is important to remember that patients are individuals, and that when selecting best practices, some flexibility must be provided for the physician and the patient. Outcome studies must be able to demonstrate that outcomes are positive in most cases over a long period of time, not just in the short term. It takes time for a procedure to be selected as the "best practice" due to its effectiveness. Often, several years must pass before the program effectiveness can be determined to be long term. It is often tedious to conduct retrospective audits of patient medical records. The use of computers can simplify the process, as well as assist health care providers in complying with and following CPGs. The near future may see computerized patient records that enable researchers to more easily determine the effectiveness of outcomes. Many civilian managed care organizations base at least a percentage of physician compensation on their compliance with Clinical Practice Guidelines. The DoD should consider such a motivator if it sincerely desires to compete with

civilian health care. The incentive to follow proven techniques should increase with a percentage of special pays being attached to how well the guidelines are followed. Outcome data and management is another valuable tool to utilize when selecting, developing, implementing, and monitoring clinical practice guidelines.

Evidence-based Medicine

Evidence based medicine is the "conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients." (http://medicine.ucsf.edu) Effective CPGs should derive from the most up to date evidence-based medicine to ensure the best outcomes and results possible. There are five steps to the evidence-based medicine process. The first step is to develop clinical questions that need to be answered, such as "how can the incidence of low back pain be reduced?" Once questions to answer have been identified, then research should be done to identify the best evidence to answer those questions. Validity and applicability of this evidence should be critically appraised before the results are applied in clinical practice. Once applied in the form of CPGs, outcomes must be evaluated for their effectiveness. Evidence-based medicine can assist in making a diagnosis, estimating a prognosis, deciding on the best therapy available, determining harmful actions, and providing high quality care. (http://medicine.ucsf.edu) Clinical Practice Guidelines that utilize evidence-based medicine separate opinion from fact, whereas "consensus guidelines" based on expert opinion can be, and often are wrong. Basing them on empirical evidence is more effective and achieves better outcomes. Evidence-based guidelines are not "cook book" medicine because it informs, and still requires clinical expertise and decision as to how it fits their individual patient. Evidence-based clinical practice guidelines are beginning to be validated by years of outcomes measurements and continue to evolve and improve as time goes on and medical technologies continue to

advance (Bennett, 1987). Before selecting and implementing pre-existing guidelines, they must be examined in terms of what evidence-based medicine it was based upon, and if there are any more modern contraindications or changes to that evidence.

Methods and Procedures

A literature review was completed to identify the process for clinical practice guideline selection, implementation, and evaluation. The review also collected several clinical practice guidelines to compare levels of detail, as well as to identify key components that made them effective or ineffective.

A retrospective study of DeWitt Health Care System patient medical records 4 months following the low back clinical practice guideline implementation on 13 September 1999 was conducted to determine if the clinical practice guidelines were being followed, and if they were not, to identify those areas requiring additional training. All patients who are diagnosed with one or more of the IDC-9-CM Codes found in appendix A were initially considered in the study. Upon further examination, it was determined that the four key diagnoses that the guideline targeted (Acute and Chronic Low Back Pain, and Acute and Chronic Sciatica) should be focused on, and the other diagnoses were removed from the study. Key metrics measured were chosen from a list of possible monitors (see Appendix G), and include percent of first visits for LBP in which a neurological exam was performed, percent of acute LBP patients who are referred for physical therapy or manipulation, percent of acute LBP patients for whom x-rays were obtained, percent of primary care physicians who received the LBP guidelines, percent of acute LBP patients for whom CT scans or MRIs were obtained, and percent of LBP patient charts that contain LBP documentation forms. The study collected a total of 69 patient records that

used the guideline from 13 September 1999 to 12 January 2000. The goal was at first to wait until a sample of 100 was available, but the slow buildup of records indicated that not all providers were following the guideline, and that action was needed to identify the weak areas and increase efforts to increase the use of the guideline.

Results of Research

The retrospective chart review for patients with low back pain from 13 September 1999 to 12 January 2000 indicated that the guidelines were not being followed in some cases and further education and training of the staff was required. A total of 69 MEDCOM Form 695-Rs were collected during this time period. Of these 69 charts, 60 were for primary diagnoses of acute or chronic low back pain or sciatica, and 9 were for diagnoses other than low back pain, such as sacroiliac disorders, upper back pain, or Ureterolithiasis. There were a total of 41 acute low back pain, 16 chronic low back pain, 10 acute sciatica, 9 chronic sciatica, 5 sacroiliac disorders, 2 upper back pain, 2 Ureterolithiasis, 1 Epididymoorchitis, 1 Trochanteric Bursitis, 1 Trapezius Spasm, and 1 Lumbosacral Strain diagnoses. The population demographics are fairly diverse. There were 58 active duty or retired military patients and 11 family members. The guideline is only used for those patients over the age of 17, and none of these charts included any not in this category. The majority of these patients suffered from low back pain from non traumatic injury (48). The rest (21) resulted from a traumatic event. There were 23 of the 69 patients who had red flag conditions identified. There were 14 suffering from night pain (56%), 7 who were over the age of 50 (28%), 2 with bladder or bowel abnormalities (8%), one with hypothyroidism (4%), and one with diabetes mellitus (4%). There were 44 males and 25 females in the study. Only one set of labs was ordered. There were 8 plain films, 1 bone scan, and 1 kidney ultrasound indicated and completed. There were 11 referral/consults to physical therapy, 1 to sports

medicine, 1 to neurosurgery (to rule out cauda equina syndrome for bowel and bladder dysfunction), 1 to the pain clinic, 1 to orthopedics, and 1 to electromyogram/nerve conduction velocity. One trigger point injection was performed. 4 MRIs and 2 plain films were performed prior to the visits. These studies identified two unknown results, one L5 compression, one L5 disk bulge, one L4 diskectomy, one L5S1 herniated nucleus polposus, one L1-2 fusion, and one L3 degenerative disk disease. A total of sixty-two abnormalities were identified in the charts. Thirty-six were tender to palpation, ten had decreased range of motion, six had positive straight leg raise tests, five had bowel or bladder abnormalities, two had neurological deficits, two had decreased strength, and one had decreased sensation.

Discussion

A well-developed system to select, implement, and continuously evaluate clinical practice guidelines result in improved patient outcomes, and in improved clinical operations. Any facility can develop facility specific clinical practice guideline processes, from determining which CPG's to implement, to deciding what metrics to follow to determine CPG success. When considering CPGs for implementation, if it is found that two or more guidelines being considered contradict or conflict with one another, it is important to closely examine the references (to ensure that they are current), the authors credibility, the methodology, and consider conflicts of interest when making comparisons and final selections. It is also necessary to choose CPGs that fit the specific beneficiary population of your health care organization. The CPGs chosen must be modified as necessary to fit the unique requirements and needs of your patients. The Department of Defense can prioritize those diagnoses that are the highest volume and cost overall, and use that priorized list to determine which CPGs should be focused on. It is more cost effective to centralize the CPG selection and develop standard forms and

training aids to be used throughout the Military Healthcare System. Those facilities that deal with the diagnoses covered by these CPGs should implement them. This will enable the system to provide the best practice, highest quality care possible for all beneficiaries, resulting in better outcomes, and less costly care.

The CPG for Lower Back Pain is a more general one because of inconclusive evidence of various treatments. It serves as a good example of the difficulty involved in identifying the best practices for illnesses or injuries that have numerous methods of treatment with varying degrees of success. It also shows the importance of having metrics that indicate compliance with the CPGs. These metrics show the need for additional provider education and CPG marketing and discussion.

The Department of Defense must dedicate the appropriate resources to CPG implementation in order to implement them in the most effective and efficient manner. It should continue to develop or select CPGs using a multidisciplinary process and thorough literature review. The DoD should continue the development of on-line automated guidelines. The easier use of guidelines is made the more they will be followed and accepted. Having hyperlinks that provide supporting research and data for each section of the CPG will provide physicians with better information to make decisions with. The Military Health System, and preferably the all of the healthcare systems of the United States, should centralize flexible guidelines to optimize patient outcomes, create continuity of care across the system, decrease development and implementation costs, standardize collection of data and research, improve provider and patient satisfaction (currently a very important political issue), and achieve economies of scale.

Based on the literature review the following steps are necessary to effectively and efficiently implement clinical practice guidelines in the Department of Defense. The first step is to identify the disease to be targeted. The focus should be on prevalent, high cost, or high number of disposition

diseases with high practice variation. The next step is assemble a multidisciplinary team to evaluate the evidence through a thorough literature review surrounding the targeted disease, and then either construct a guideline or review and select a pre-existing guideline from those evidence based ones available. It is preferable to select a pre-existing and pre-proven guideline whenever possible, and modify it to fit local requirements. Once a guideline is selected or constructed, then a multi-focused training, implementation, and monitoring plan must be developed with a timeline for implementation. The guideline should have clearly stated objectives, as well as costs, benefits, recommendations, potential outcomes, and supporting evidence. Command emphasis and commitment, as well as provider consensus and buy-in is necessary before, during and after implementation. An automated support program for the new guideline should be developed as part of the implementation process. Tools to train and follow the guideline should be developed prior to implementation. Forms, checklists, simplified algorithms, and training videos and books are all necessary to implement the CPG correctly. The implementation plan should then be initiated, along with provider and patient training and education to modify their behavior, and marketing of the guideline. The guideline should be assessed for compliance and outcomes using continuous quality and performance improvement.

In the case of the DoD/VA Low Back Clinical Practice Guideline, MTFs were directed to adopt and implement the guideline across the board. Standard videos, pamphlets, brochures, and training aids were sent along with forms and the guideline and algorithms to ensure standard practices across the Army Medical Department. Training was conducted to familiarize providers at DeWitt with the guidelines and cases (see Appendix E) were utilized to discuss cases that enforce steps in guideline usage. The DeWitt Health Care System implemented the guideline in steps, starting with the main hospital primary care clinics in September 1999, and proceeding to the outlying clinics (Woodbridge,

Fairfax, Rader, and last the Aviation Medical Clinic) in January 2000. The program was first instituted in the Active Duty Sick Call clinic in the main hospital to identify and correct any major problems, then instituted in the Family Health Center of Fort Belvoir. This implementation allowed trial and error in filling out forms and allowed metrics to be monitored to determine how well providers were following the guidelines before they were implemented throughout the system. This method works well, but has the drawback of slowing down total implementation and actualized savings. The initial review of the 69 Low Back Pain forms indicated that all of the charts monitored complied with Red Flag Indicator identification. The referrals chosen were correct in terms of those identified in the guideline, and those providers who used the forms on these 69 patients did so correctly. To determine what percent of those patients diagnosed with acute and chronic low back pain and sciatica were treated utilizing the clinical practice guideline, an ADS report showing all the patients diagnosed with these conditions from 13 September 1999 to 12 January 2000 was reviewed. The review indicated that the guideline should have been used for 162 patients who were diagnosed during this time frame. The 69 charts that were correctly done only make up 43**%** of the total charts that should have been done. Monitoring this metric has identified the increased need for education, form dispersal, case review, and improved use of the guideline. Continual monitoring should show a steady increase in the percent of patients with these diagnoses that are treated using the clinical practice guideline. Over time, the data collected should demonstrate proper referrals, use of guidelines, and improved patient outcomes. The only two monitors required to be reviewed by the MHS currently are Red flag monitors and appropriate referral to orthopedics or neurosurgery for abnormal MRI findings. These are the most important in terms of patient outcomes and best practice medicine, but it is also key to monitor the percent of charts that are being correctly done, and to determine the extent that the CPG is being followed. The required forms

were distributed in hard copy and via Microsoft Outlook to department chiefs to ensure the widest dissemination possible. All providers were required to view the CPG training video and were familiarized with the forms. Continual education and training of new providers along with continuous monitoring are necessary to improve outcomes and CPG compliance. It was initially thought a quarterly chart audit would suffice, but based on the low initial percentage of charts completed, monthly ADS reports and chart audits will now be done to monitor progress. Publishing the results by clinic and provider should motivate providers to follow the guidelines and improve their percentages by following the guideline when indicated. Whenever a patient is diagnosed with one of the four monitored codes, the guideline should be used. It should not be assumed that the charts represent 100% of those patients with the indicated diagnoses. ADS reports are a good way to compare the total number of patients with these diagnoses, and the total number who are being seen using the LBP CPG algorithm, to determine how well the guidelines are being followed. Failure to use the guideline in the majority of cases will result in less than optimal levels of care and patient outcomes. The purpose of the guideline is to utilize the current best practices to maximize outcomes, and minimize costs. Unless the guideline is followed when indicated, this purpose cannot be realized.

The Department of Defense/VA has developed and issued standard tools to implement the guidelines more effectively. This method should be used with all guidelines implemented in the DoD and VA. It is more effective, and less costly to develop centralized tools and forms and then distribute to the MTFs/hospitals. There seems to be organizational commitment from the top down regarding these guidelines. It is imperative that the Military Healthcare System implement clinical practice guidelines to reduce costs if it is to survive in the current political environment. Education and training of staff must be

continuous, and the data supporting the guideline development must be available, if staff buy-in and commitment is to be obtained.

Conclusions and Recommendations

Not enough time and data are available to reliably compare pre and post guideline outcomes for low back pain. At least a year of data would be necessary to adequately track patient outcomes. Future studies should consider evaluating the effectiveness of the low back CPG with a retrospective study. The AMEDD and other services would benefit from identifying measurable CPG goals for each CPG implemented, and monitoring those goals to determine the degree of success achieved. The stated goals for the low back CPG are to improve patient quality of life and functional status, promote appropriate use of diagnostic tests and referrals to specialists, increase the use of first line medications and interventions, support a timely return to duty, and improve the timeliness of disposition for patients who cannot return to duty. These goals are for the most part measurable, and will be tracked by MTF reporting. The quality of patient life and functionality is difficult to measure effectively, but the others can be numerically expressed in certain ways. Timely return to duty must be defined, whether it be 2 days or a week, to establish a goal based upon retrospective analysis of the effectiveness of the treatments specified in the CPG. The use of first line medications and interventions and the time of disposition previous to the implementation of the LBP CPG is needed in order to compare it to the use following implementation.

All Military Health System CPGs should have CME (Continuing Medical Education) learning objectives in order to focus training efforts on specific goals. The LBP CPG for example has four major learning objectives. The first is to discuss the appropriate evidence based treatment for patients with acute and chronic low back pain. Discussion of specific cases will assist providers in choosing the most

effective treatments for specific individual cases, and also review the guideline process. The second learning objective is to differentiate acute versus chronic low back pain. This is an important differentiation to determine the proper course of treatment. The third is to correctly identify red flag conditions in patients with low back pain. The retrospective review of low back pain charts will enable the determination to be made as to when red flag conditions existed and when they were appropriately and inappropriately referred. This data can once again assist in determining the need for additional training and information sharing. The fourth objective is to perform a rapid, yet comprehensive neurological examination for the assessment of the patient with low back pain. With 15-minute patient appointments the norm, it is imperative that care be given quickly, but also thoroughly. The CPG for low back pain guides patient questioning and examination, and, if followed, should optimize use of the time available for the patient. Each CPG adopted by the MHS should have similar objectives identified, and documented in order to track the effectiveness of training and of the CPG itself.

The services should centralize guidelines to optimize efficiency, reduce costs of development and implementation, standardize documents and patient education handouts, simplify data collection, and improve continuity of patient care for military beneficiaries. Such centralization will make optimal use of limited resources.

The MHS should research and consider the cost and benefit of templating longer patient appointments with physicians. Preventive medicine and early disease detection are paramount to reducing the incidence of disease and injury. A 15 or 20 minute appointment is simply not enough time to fill out the ADS form, get a complete patient history, talk with the patient about their symptoms, examine the patient, follow the guidelines, enter prescriptions, and ensure the patient has an understanding of their condition and treatment. Even with KGADS eliminating the ADS forms, time is

still a precious commodity. The more time a physician has with a patient, the better the care that can be provided (to a point of diminishing return). A patient that leaves confused, with questions unanswered is likely to be back later on for more expensive treatment. A cost benefit/effectiveness analysis should be done on all CPG monitoring metrics over time to estimate the amount and extent to which outcomes are improved and justify the expenses of the CPG implementation.

The potential benefits of selecting, implementing, and evaluating clinical practice guidelines for high volume or high cost diagnoses in the Military Healthcare System are tremendous. The costs of healthcare can be dramatically reduced as resources are more optimally utilized, and beneficiary outcomes are improved. The continued and increased use of clinical practice guidelines throughout the Military Health System will enable it to be competitive with its civilian counterparts, and will enable it to survive and continue to serve those warriors who serve and who served our great nation.

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http://medicine.ucsf.edu

http://www.orthospine.com

http://www.vh.org/Patients/IHB/Ortho/Backpatient/Causes.html

Appendix A
Low Back Pain ICD-9-CM Codes

Clinical Category	ICD-9-CM Codes	Diagnosis
Miscellaneous	724.3	Sciatica
	724.4	Thoracic or lumbosacral neuritis or radiculitis, unspecified
	724.8	Other symptoms referable to back
	724.9	Other unspecified back disorders
	737.10-.30	Idiopathic scoliosis
	738.5	Other acquired deformity of back or spine
	756.1	Anomaly of spine, unspecified
	355	Mononeuritis – sciatic nerve
	724.79	Coccyx
	729.2	Radicular pain
	953.5	Injury nerve – lumbar plexus
	953.2	Injury nerve – spinal root – lumbar
Herniated disc	722.1	Displacement of thoracic or lumbar disc without myelopathy
	722.1	Displacement of lumbar disc without myelopathy
	722.2	Displacement of unspecified disc without myelopathy
	722.7	Disc disorder with myelopathy, site unspecified
	722.73	Lumbar disc disorder with myelopathy
	722	Radiliculitis due to disc involvement
Degenerative Changes	721.3	Lumbosacral spondylosis without myelopathy
	721.5-.8	Unique or unusual forms of spondylosis
	721.9	Spondylosis of unspecified site without myelopathy
	722.52	Degeneration of lumbar of lumbosacral disc
	722.6	Degeneration of disc, site unspecified
	722.9	Other and unspecified disc disorder, site unspecified
	722.93	Other and unspecified lumbar disc disorder
Spinal Stenosis	721.42	Spondylogenic compression of lumbar spinal cord
	721.91	Spondylogenic compression of spinal cord, not specified
	724	Spinal stenosis, unspecified site (not cervical)
	724.09	Spinal stenosis, other
	724.02	Lumbar stenosis
Nonspecific Backache	724.6	Disorders of sacrum (including lumbosacral joint instability)
	738.4	Acquired spondylolisthesis
	756.11	Spondylolysis, lumbosacral region
	756.12	Spondylisthesis
	307.89	Psychogenic backache
	724.2	Lumbago
	724.5	Backache, unspecified
	846.0-9	Sprains and strains, sacroiliac
	847.2	Sprains and strains, lumbar
	847.3	Sprains and strains, sacral
	847.9	Sprains and strains, unspecified region

Those ICD-9-CM Codes selected for monitoring:
724.2 Acute Low Back Pain
724.9 Chronic Low Back Pain
725.3 Acute Sciatica
729.5 Chronic Sciatica

Appendix B

JCAHO Proposed Standards Relating to the Use of Clinical Practice Guidelines

Standard

LD.1.10 Clinical practice guidelines are considered for use in designing or improving processes, as appropriate.

Intent of LD.1.10

Clinical practice guidelines provide a means to improve quality, enhance appropriate utilization of health care services, and enhance the value of health care services. Clinical practice guidelines assist practitioners and patients in making clinical decisions on the prevention, diagnosis, treatment and management of selected conditions.

Clinical practice guidelines can also be used in designing clinical processes or checking the design of existing processes. Clinical practice guidelines addressing these areas are identified and considered by leaders for implementation.

The hospital's leaders consider such sources as the Agency for Health Care Policy and Research (AHCPR), professional medical societies and physician organizations, professional health care associations, and local organizations.

Scoring for LD.1.10

Do the hospital's leaders consider using clinical practice guidelines when designing or improving patient care processes that evaluate and treat specific diagnoses, conditions or symptoms, as appropriate?

Score 1	Always
Score 2	Usually
Score 3	Sometimes
Score 4	Rarely
Score 5	Never

Note: Clinical practice guidelines may be from local (developed internally by the hospital), state, or regional level sources. Regardless of the source, all clinical practice guidelines should undergo a process of review and approval by appropriate hospital leaders and clinical practitioners prior to implementation as addressed in the following standards and intents.

If the hospital's leaders are not using clinical practice guidelines when designing or improving clinical patient care processes, the remaining standards (LD.1.10.1 through LD.1.10.3) are scored "NA".

Standard

LD.1.10.1 When clinical practice guidelines are used, the hospital's leaders identify criteria for their selection and implementation.

Intent of LD.1.10.1

The hospital's leaders set criteria to guide the selection and implementation of guidelines that are consistent with the organization's mission and priorities.

Leaders also consider the steps and changes or variations needed to encourage use, dissemination and implementation of chosen guidelines throughout the organization. This includes staff communication, training, implementation, feedback, and evaluation. Methods of dissemination and implementation can include manual and/or computer designed tools.

Implementation criteria for clinical practice guidelines consider the following:

Modification(s) necessary to support specific level or locus of guideline implementation

Mechanisms for anticipating, evaluating, and learning from variation in guideline(s) compliance.

Recommended or selected measures pertinent to decision points, outcomes and variations relating to compliance.

Whether the guidelines can assist the practitioner in making decisions about appropriate health care for specific clinical circumstances.

Whether the guidelines are based on current professional knowledge and are reviewed and revised periodically.

Mechanisms for disseminating information about implementation of selected guidelines

Scoring for LD.1.10.1

a. When clinical practice guidelines are used, have the hospital's leaders identified criteria to guide their selection and implementation?
b. Do the criteria anticipate variation?
c. Do mechanisms exist to manage, evaluate, and learn from variation?

The following scores apply to questions a, b, and c.

Score 1 Always
Score 2 Usually
Score 3 Sometimes
Score 4 Rarely
Score 5 Never
NA

Standard

LD.1.10.2 Appropriate leaders, practitioners, and health care professionals in the hospital review and approve clinical practice guidelines elected for implementation.

Intent of LD.1.10.2

Identified clinical practice guidelines may be found suitable for use as written or they may need to be modified by the physicians and other health care professional who will use the clinical practice guidelines. To increase the success of the implementation of guidelines, they should be reviewed by the providers using them, revised or adapted as necessary, and approved by appropriate leaders. Modifications of the clinical practice guidelines may be necessary to form a consensus on appropriate clinical or medical practice or to adapt them to the specifications of the hospital. Once the clinical practice guidelines have been reviewed and approved by physicians and health care professionals, they are approved by appropriate leaders prior to implementation.

Scoring for LD.1.10.2

Have appropriate hospital leaders reviewed and approved the clinical practice guidelines selected for use?

Score 1 Yes, appropriate clinical leaders, including medical staff members, have reviewed and approved the selected guidelines.
Score 2 Yes, appropriate clinical leaders, including medical staff members, have reviewed, but not yet approved the selected guidelines.
Score 3 One appropriate clinical leader has not reviewed or approved selected guidelines.
Score 4 Two or three leaders have not reviewed or approved selected guidelines.
Score 5 Appropriate leaders have not reviewed or approved selected guidelines.
NA

Standard

LD.1.10.3 Leaders evaluate the outcomes related to use of clinical practice guidelines and determine indicated refinements to improve pertinent processes.

Intent of LD.1.10.3

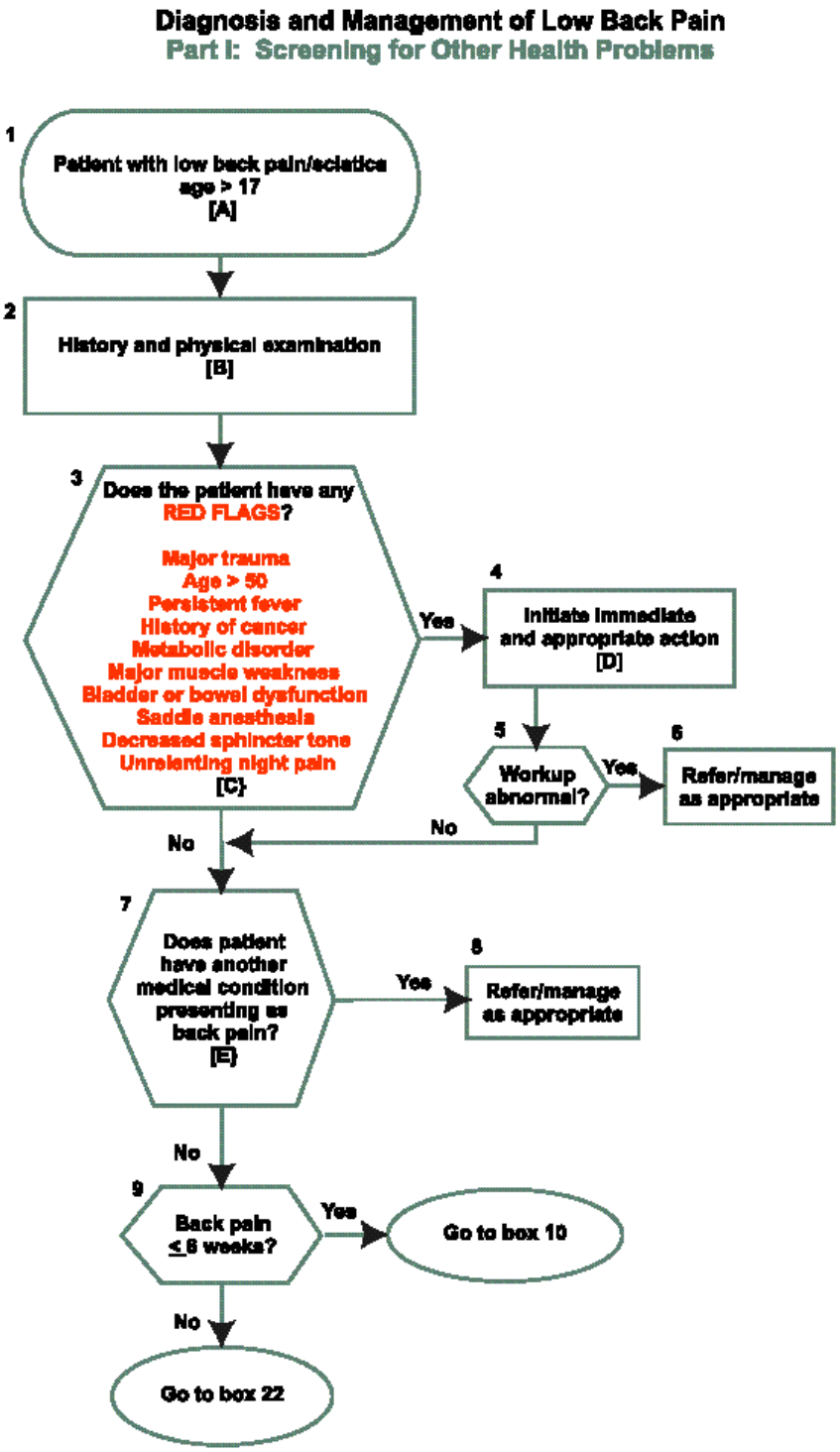
Once approved and implemented, the clinical practice guidelines are monitored for their effectiveness in the hospital. The hospital's leaders assure that the outcomes of patients who are treated using clinical practice guidelines are evaluated and refinements are determined, if necessary. The leaders also provide a process for physicians and health care professionals to explain variations from the clinical practice guidelines. The clinical guidelines are periodically reviewed and modified as necessary.

Scoring for LD.1.10.3

Do the leaders monitor and review the effectiveness of clinical practice guidelines and make appropriate changes?

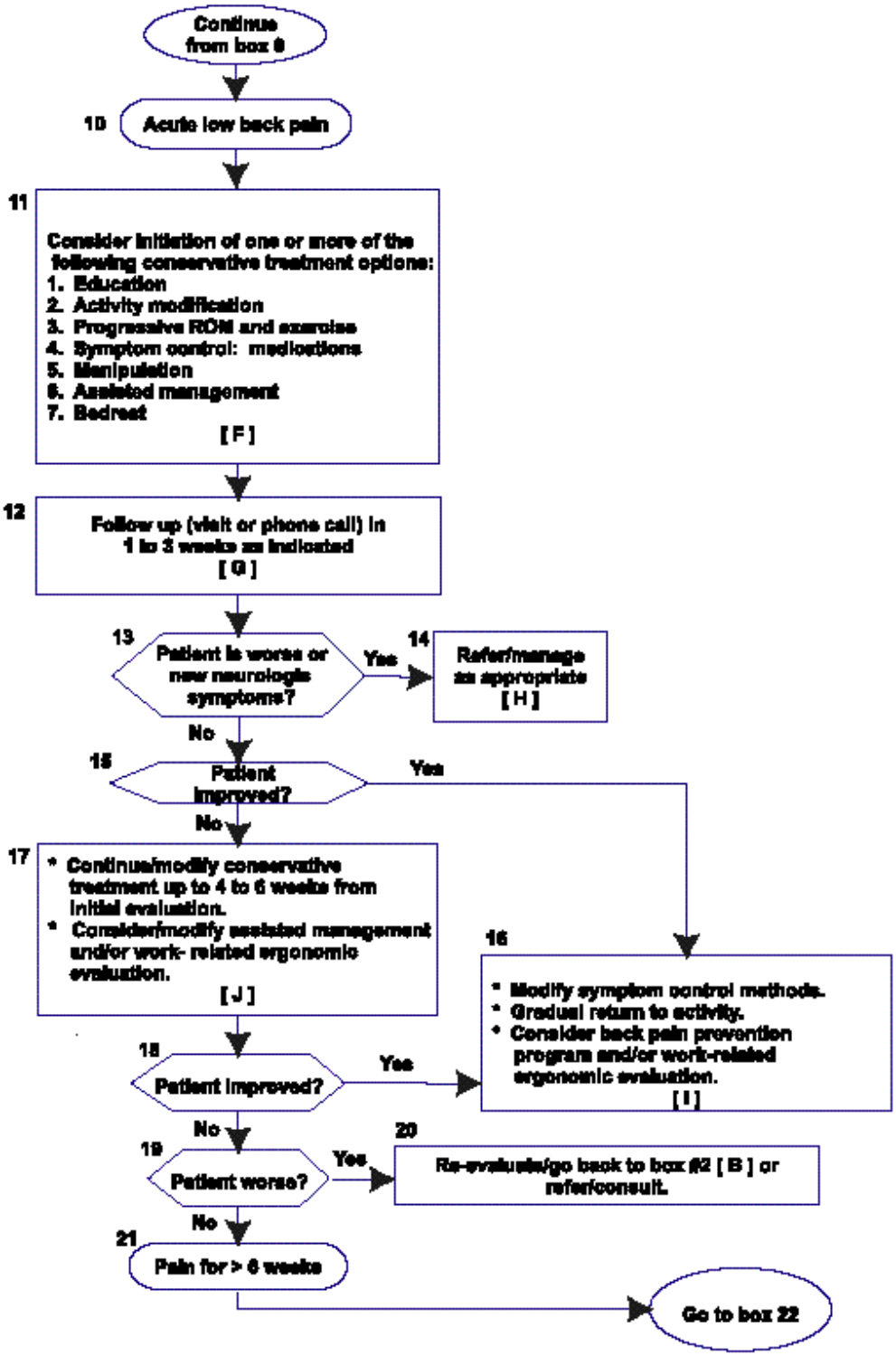
Score 1	Always
Score 2	Usually
Score 3	Sometimes
Score 4	Rarely
Score 5	Never
NA	

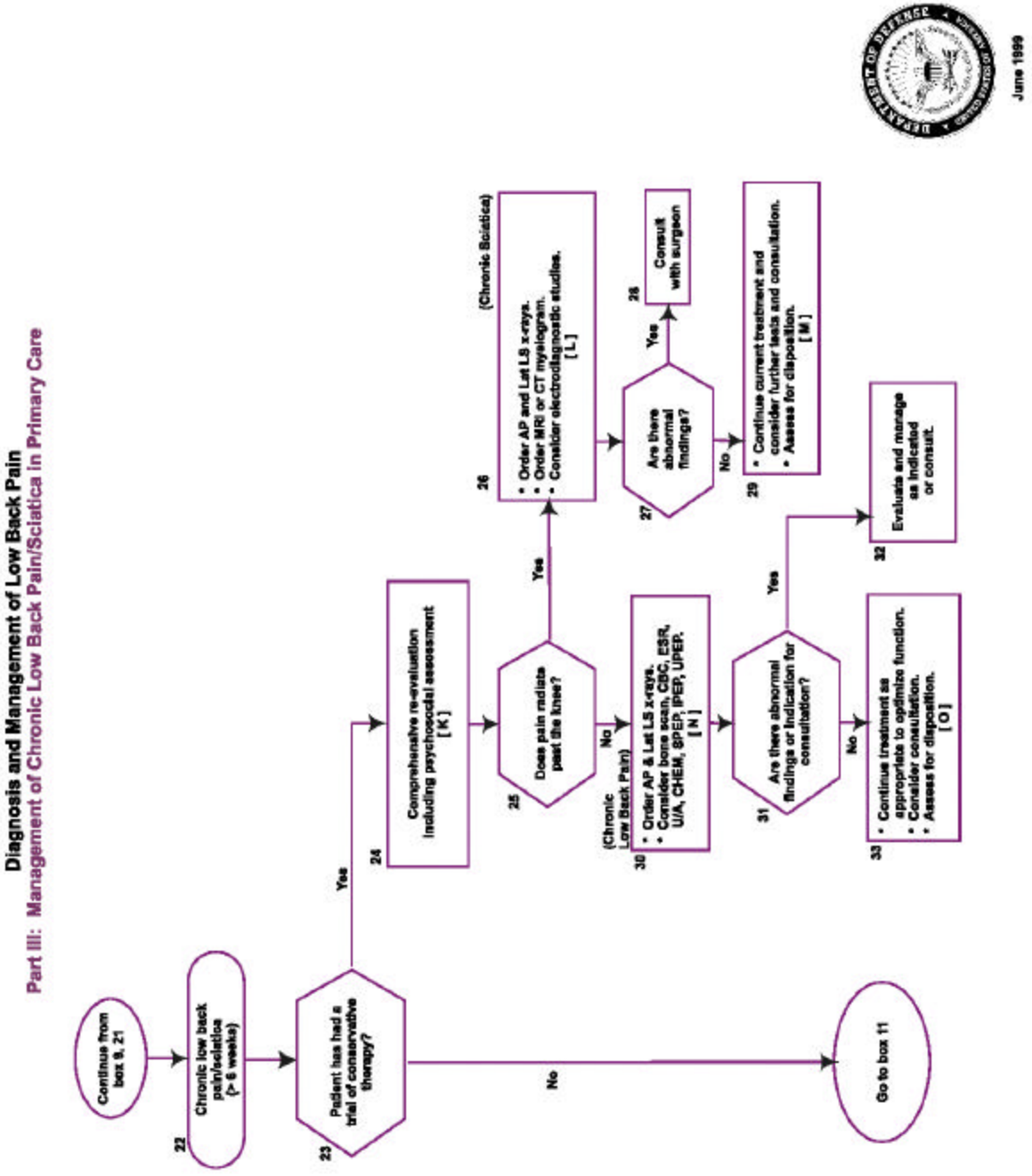
Appendix C



(CPG Low Back Pain Flow Charts)

Diagnosis and Management of Low Back Pain
Part II: Management of Acute Low Back Pain/Sciatica in Primary Care




Diagnosis and Management of Low Back Pain
Part III: Management of Chronic Low Back Pain/Sciatica in Primary Care
Continue from box 9, 21
22
Chronic low back pain/sciatica (> 6 weeks)
23
Patient has had a trial of conservative therapy?
Yes
No
24
Comprehensive re-evaluation including psychosocial assessment [K]
25
Does pain radiate past the knee?
Yes
No
(Chronic Low Back Pain)
30
• Order AP & Lat LS x-rays.
• Consider bone scan, CBC, ESR, U/A, CHEM, SPEP, IPEP, UPEP. [N]
31
Are there abnormal findings or indication for consultation?
Yes
No
(Chronic Sciatica)
26
• Order AP and Lat LS x-rays.
• Order MRI or CT myelogram.
• Consider electrodiagnostic studies. [L]
27
Are there abnormal findings?
Yes
28
Consult with surgeon
No
29
• Continue current treatment and consider further tests and consultation.
• Assess for disposition. [M]
32
Evaluate and manage as indicated or consult.
33
• Continue treatment as appropriate to optimize function.
• Consider consultation.
• Assess for disposition. [O]
Go to box 11
June 1999

Appendix D (DHCS CPG List)
(as of 1 November 1999)

Clinical Guideline	Clinical Champion	Proponent Organization
Hypertension	CPT Shalauta	DoD/NARMC
Well Child Care	COL Horn	NCA/HEDIS
Hyperlipidemia	CPT Shalauta	DoD/NARMC
Low Back Pain	LTC Nishimura	DoD
Respiratory Disease Asthma/COPD/Adult URI/Smoking Cessation	CPT Saad	DoD
Diabetes	CPT Shalauta	DoD
UTI/BPH	TBD	DoD/NARMC
Acute MI	CPT Saad	DoD
Depression	COL Wymes	DoD
Gerd	COL Sodhi	NARMC
NSAID Use	LTC Nishimura	NARMC
Allergic Rhinitis/ Allergy Disease	MAJ Deguzman	NARMC
Obstetric Topic	MAJ Harrison	ORYX
Geriatric Topic	Dr. Gowda	HEDIS

Appendix E (Case Studies)

The following was prepared by MR, GC, and EQ; Revised 12/16/98:

Introduction to Case Studies

These case studies are provided to help you learn the DoD/VA guidelines. The cases are divided into sections such as history, physical exam/assessment, treatment, and follow-up/disposition. A variety of cases are presented to help you study and evaluate the entire guideline. You may encounter cases that fall out of the guideline, just as real patients would.

How to use These Case Studies:

1) Read the history section for a case study first. Stop and ask which path of the algorithm you would follow.

2) After you've decided on the path to follow, read the section on the physical exam in the case study. Follow the algorithm. Refer to the annotations, expanded annotations, and the discussion parts of the guideline when questions arise.

3) The treatment section of the case study should assist you in completing the algorithm. The goal of the case study is to work through the algorithm, not to evaluate the treatment as written.

4) Next, consider follow-up or disposition for the patient.

5) Conclude by thinking through what you learned. Where were you uncertain as you worked through the case study? How will the guideline work in your facility?

This file contains appropriate case studies related to the VA/DoD guideline for Low Back Pain.

Case #1

History: 19-year-old male soldier with two weeks of non-radiating midline low back pain, acute onset while setting up a tent, has taken no over-the-counter medications. No bowel or bladder symptoms; feels weakness in his back, no saddle numbness. Had one previous episode of back pain while in high school. Resolved automatically. No other medical or surgical history.

Physical Exam/Assessment: Walks gingerly. No worsening of pain with straight leg raise. Paraspinous tenderness on palpation. Limited forward flexion. BP 115/60, P 62, T Normal, RR 12. Lungs clear, heart regular rhythm. Remainder of physical exam – WNL.

Treatment: Profile – no Physical Training x2 weeks. Ibuprofen 600 mg q6h x 1 week then prn for the next week.

Follow-up/Disposition: Patient education for injury prevention.

Case # 2

History: 24-year-old female soldier presents with sudden onset of low back pain. Pain began two days ago when arising from bed. Intermittent, sharp and severe. Does not radiate and is predominantly right-sided. Denies injury or trauma. No dysuria.

Physical Exam/Assessment: BP 95/54, T Normal, P 76, RR 18. Back-right costovertebral angle tenderness. Labs: negative ACG. Urinalysis-26 red cells, no white cells, no bacteria. Normal range of motion in back and extremities. Negative – SLR. Remainder of physical exam is normal.

Treatment: Quarters x 72h. Strain all urine. Analgesics for 3 days.

Follow-up/Disposition: Return to clinic in three days. Follow-up visit. One day prior to follow-up had one single episode of 10/10 pain with urination. Back pain now resolved. Told to return if another episode of pain. Return to full duty.

Case # 3

History: A 25-year-old male soldier presents with low back pain onset while at the range when he had to lift a round for the tank. Pain so severe he has difficulty walking. No prior hx of back pain.

Physical Exam/Assessment: BP 100/54, T Normal, P 96, RR 16. Lungs: clear, CV: RRR, Neuro: left-sided foot drop. Pain is in the lower back and radiating down the left leg. Positive straight leg raise. Rest of exam – WNL.

Treatment: MRI showed L4-5 disc herniation and neural impingement.

Follow-up/Disposition: Refer for surgical consultation.

Case # 4

Past Hx: A 60-year-old female, smoker with COPD, on steroids. Complains of back pain. Says her back pain started when she coughed last night. Low back pain at rest.

Physical Exam/Assessment: BP 170/85, P 88, RR 30, T 99. Lungs – diffuse wheezes, prolonged expiratory phase. Abdomen – obese, non tender. Right flank pain. Straight leg raises – inconclusive. Point tenderness over L4-5 vertebrae.

Treatment: Send for AP/Lateral Lumbar Spine films. Reveals enlarged calcified abdominal mass. L/S spine is normal.

Follow-up/Disposition: Refer to vascular surgeon.

Case #5

History: 44-year-old female developed low back pain when she was doing yard work three weeks ago. The pain is dull and aching and does not radiate. It gets worse with activity but is present even at rest. Had a hysterectomy at age 36 for fibriods. No other significant history. Has been taking Tylenol for one week with no relief.

Physical Exam/Assessment: BP 140/90, P 86, RR 14, T Normal. Physical Exam – WNL. Range of motion and neurologic exam of the lower extremities is normal.

Treatment: Modify activity. No heavy lifting, avoid straining. Flexoril 10 mg tid as needed. Report back to clinic in three weeks if symptoms persist. Unchanged. Continue same treatment for another 4 weeks. Pain worsens. Is now present at night and unrelenting. Now CBC shows anemia, CT Scan shows lesion at L-5 and heterogeneous liver lesions consistent with metastatic CA. Mammogram shows left chest wall lesion consistent with primary breast CA.

Follow-up/Disposition: Refer to breast surgeon.

Case # 6

History: A 35-year-old soldier comes in after returning from Korea, reporting 5 months of recurring generalized low back pain without leg pain. He was treated with 2 days of bed rest, modified activity, analgesics and exercises. There was no improvement after this conservative treatment. He continued to sleep poorly and had a 10 pound weight loss in past 4 months.

Physical Exam/Assessment: Normal except for mild limitation of forward and lateral flexion. Pain does not radiate past the knee. Involved in divorce proceedings and custody negotiations.

Treatment: When he returned to the USA, he got AP and lateral L/S spine films and CBC, Sed Rate and UA. These were all WNL. Profile- no Physical Training x2 weeks. Manual therapy and exercises. Follow-up after three weeks showed condition essentially unchanged.

Follow-up/Disposition: Refer to psychiatrist and medical evaluation board (MEB).

Case # 7

History: A 33-year-old male presents with a 2-month history of back and leg pain. Has completed conservative treatment for symptom control. Pain persists and patient is presenting to clinic for further treatment. Doesn't recall how the pain began. Pain is relieved at rest and has improved while on profile of no Physical Training.

Physical Exam/Assessment: No psychosocial problems. Positive straight leg raises. Tenderness at L4-5 vertebrae. Pain still radiating down his leg.

Treatment: x-ray, MRI, and EMG all negative

Follow-up/Disposition: Refer to back surgeon.

Appendix F (Muscles of the Back and Spine)

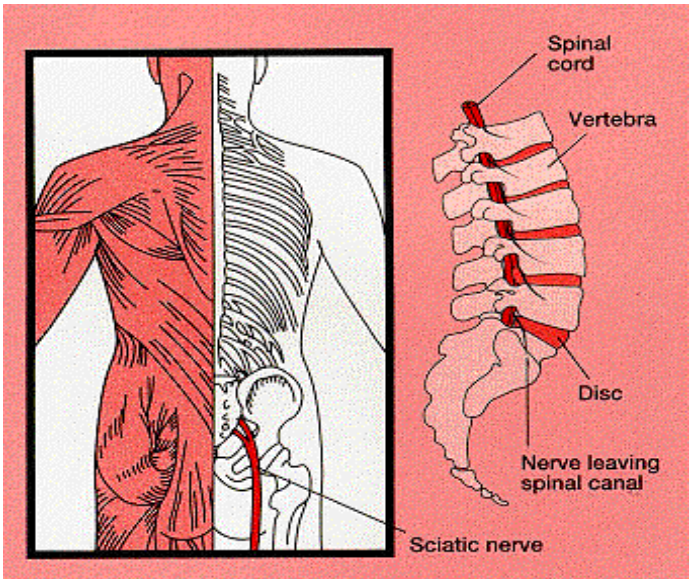


Figure 1. Muscles of the back and the spine

The spine is made up of a series of vertebral "blocks" which are separated from one another by soft tissue discs. The spinal canal sits within the structure of the spine and contains neurologic structures (nerve roots and the spinal cord). There is normally some space between these structures and the spinal canal, but injury to the back and spine may reduce this space, causing irritation or injury of the spinal nerves or cord. Trauma, infection, tumors, herniated discs, degeneration or arthritis may all lead to this reduction of space, and creation of pain and injury.

Appendix G (Monitoring Indicators of Implementation)

Process of Care Metrics

Percent of first visits for LBP in which a neurological exam was performed

Percent of acute LBP patients who are referred for physical therapy or manipulation

Average time from first LBP visit to physical therapy/manipulation referral for those who are referred

Percent of acute LBP patients for whom x-rays were obtained

Percent of primary care clinicians who received the LBP guideline

Percent of LBP patients coded as cancer within 6 weeks (shorter time) of first LBP visit who are referred to a specialist from first LBP visit

Percent of acute LBP patients for whom CT scans or MRI were obtained

Percent of LBP patient charts that document patient education

Percent of LBP patients coded as Cauda Equina within 6 weeks (shorter time) of first LBP visit who are referred to a specialist from first LBP visit

Percent of LBP patients coded as infection within 6 weeks (shorter time) of first LBP visit who are referred to a specialist from first LBP visit

Percent of LBP patient charts that contain LBP documentation form

Average time from first LBP visit to first x-rays

Average time from first LBP visit to first CT scans or MRIs

Percent of acute LBP patients for whom narcotics/benzodiazapines were prescribed 7+ weeks after initial LBP visit

Percent of acute LBP patients for whom narcotics/benzodiazapines were prescribed <7 weeks after first visit

Percent of acute LBP patients who are referred for physical therapy

Percent of acute LBP patients for whom NSAIDs/muscle relaxants were prescribed 7+ weeks after initial LBP visit

Percent of LBP patient charts that contain numeric scale measures of pain severity

Percent of acute LBP patients who are referred for manipulation

Average time from first LBP visit to physical therapy referral for those who are referred

Percent of acute LBP patients for whom narcotics/benzodiazapines were prescribed <4 weeks after initial LBP visit

Percent of acute LBP patients for whom NSAIDs/muscle relaxants were prescribed <7 weeks after initial LBP visit

Percent of acute LBP patients for whom CBC or ESR tests were obtained

Percent of acute LBP patients for whom NSAIDs/muscle relaxants were prescribed <4 weeks after initial LBP visit

Average time from first LBP visit to physical manipulation referral for those who are referred

Average time from first LBP visit to first CBC or ESR tests

Percent of acute LBP patients for whom narcotics/benzodiazapines were prescribed before initial LBP visit

Percent of acute LBP patients for whom NSAIDs/muscle relaxants were prescribed before initial LBP visit

Clinical Outcomes Metrics

Average improvement in disability for acute LBP/sciatica patients, as measured by Oswestry LBP instrument

Percent of acute LBP/sciatica patients who progress to chronic

Average number of days to full return to duty status for military personnel with LBP/sciatica that results in restricted duty status

Percent of military personnel with LBP/sciatica who return to full duty work within 6 weeks

Average improvement in Fear Avoidance Behavior Questionnaire (FABQ) score for acute LBP/sciatica patients

Percent of "lost" acute LBP patients with continuing disability >6 weeks after first visit, based on Oswestry score

Incidence rate of new low back pain or sciatica patients among active duty personnel

Average number of sick call days for military personnel due to LBP/sciatica

Average improvement in physical and mental health status, as measured by the SF-12

Incidence rate of new low back pain or sciatica patients among dependents of active duty personnel

Percent of chronic LBP/sciatica patients referred to Medical Examination Board

Incidence rate of new low back pain or sciatica patients among retirees or dependents

Patient Satisfaction Metrics

Satisfaction with amount of education and instruction provided for LBP care

General satisfaction with treatment for acute low back pain/sciatica

Satisfaction with extent of pain alleviation for acute low back pain/sciatica

Satisfaction with administrative services during treatment for acute low back pain/sciatica

Satisfaction with tests/special studies received during treatment for acute low back pain/sciatica

Appendix H
(Low Back Pain Education Handouts)

Treating Your Own Back

Recovery from an acute injury takes some time. It is important to increase your activity gradually so you do not increase your discomfort.

If you suffer from an acute back injury—

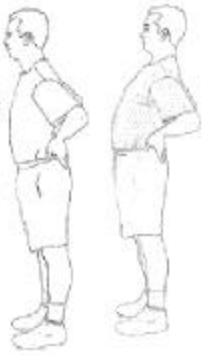
- Perform stretches in a smooth motion and hold the position for a few seconds; do not bounce or jerk while stretching.
- Do these stretches and exercises after a day or two of rest, if rest is necessary.
- Get your muscles ready for activity by stretching. This reduces the tightness in muscles and provides them with more blood flow.
- You may experience some discomfort when doing these exercises. If the discomfort increases and remains the following day, consult your doctor.
- Devote just 10 to 20 minutes a day to the health of your back. It will aid your recovery and help prevent further injury.

Press-Ups

1. Lie on your stomach with your legs straight and feet together. 2. Prop up your upper body with your forearms. 3. Push upward while keeping your pelvis on the floor. 4. Hold for five seconds. 5. Gently lower yourself to the floor. Remember to keep your forearms in contact with the floor at all times. 6. Repeat five times.

Backward Stretch

1. Stand upright. 2. Place your feet a shoulder width apart. 3. Place your hands on your lower back. 4. Lean backward while keeping your neck straight. 5. Lean further back until you feel a slight stretch in your back. 6. Hold for a count of five. 7. Return to the upright position. 8. Repeat three or four times.



Lower Back and Hip Stretch

1. Lie on your back with knees bent and feet flat on the floor. 2. Press your lower back onto the floor. 3. Grasp one knee with both hands and pull toward your chest keeping your head on the floor. 4. Keep the other knee bent and foot on the floor. 5. Hold for a count of ten. 6. Return to starting position. 7. Repeat with the other leg. 8. Repeat ten times on each leg for three sets.

Pelvic Tilt

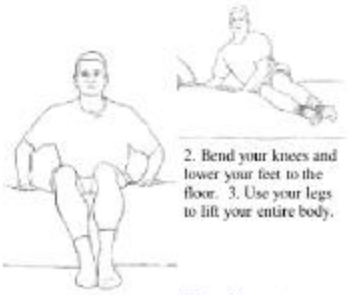
1. Lie on your back. 2. Bend your knees at a 90-degree angle. 3. Tighten stomach muscles and buttocks. *See Figure A.* 4. Slowly push your lower back downward. 5. Hold your back in this position for five seconds. *See Figure B.* 6. Slowly return to normal and relax. *See Figure A.* 7. Repeat five times.

Figure A

Figure B

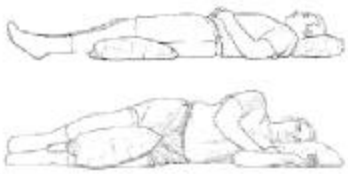
Good Body Mechanics Can Protect Your Back

Getting out of bed. 1. Roll on your side and push your body up with your arms.



2. Bend your knees and lower your feet to the floor. 3. Use your legs to lift your entire body.

Sleeping. 1. Sleep on a firm, comfortable mattress. 2. If the mattress is too soft, insert a board under the mattress for firmness. 3. Sleep on your back with a pillow under your knees or on your side with a pillow between your bent knees. 4. Sleep on a contoured pillow (with a shallow curve for the head) to help keep your neck and spine aligned during sleep.



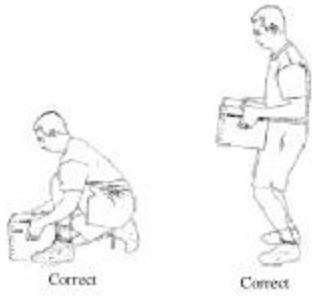
Getting into a vehicle. 1. Use the door to help you sit. 2. Grasp the steering wheel for support when seated, and slowly swing both legs into the car. 3. If you use a seat pad or back support, secure it to the seat to prevent slippage.

Getting out of a vehicle. 1. Use the steering wheel as leverage to help pivot your lower body out of the car. 2. If possible, slowly swing legs out of the car at the same time to prevent twisting your back. 3. Use the door for support as you raise your body with your legs.

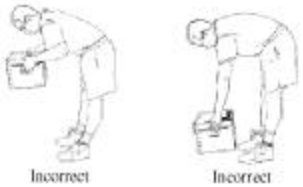
Sitting. While sitting at work or at home, try to maintain good posture. 1. Keep your knees at a 90-degree angle. 2. Keep your feet flat on the floor or on a footrest. 3. Use a back support or a rolled up towel to support the normal curvature of your lower back. 4. Keep your ears, shoulders, and hips in a straight line perpendicular to the floor. 5. Bend your elbows at about 90 degrees, with your wrists parallel to the floor. 6. Allow your arms to rest on the soft armrests of a chair. This will also relieve some compression on your lower back.

Correct Incorrect

Lifting. 1. When lifting, keep the object close to your body. 2. If the object is on the floor, widen your stance (slightly outside of shoulder width) and bend only at the hips and the knees. 3. Keep your back in its normal arched position while lifting. 4. Do not lift by bending forward and using your lower back. 5. Do not twist while you are lifting. 6. Take a breath and breathe out as you exert yourself during the lift. 7. Tighten your stomach muscles and begin the upward lift by using your legs. 8. If you are carrying the object, be sure to keep it close to your body and maintain a straight spine.



Correct Correct



Incorrect Incorrect

Appendix I
(1999 DHCS Top Volume DRGs)

	DRG		#Dispositions
1.	391 Normal Newborn		606
2.	373 Vaginal Delivery w/o Complications		502
3.	630 Neonate, Birth weight 2499G		165
4.	372 Vaginal Delivery w/ Complications	142	
5.	143 Chest Pain	113	
6.	370 Cesarean section w CC		78
7.	89 Simple Pneumonia and Pleur		75
9.	98 Bronchitis & asthma age		58
10.	127 Heart Failure and Shock		54
11.	359 Uterine and Adnexa Proc		54
12.	383 Other Antepartum Diagnoses		49
13.	167 Appendectomy w/o Complications	46	
14.	182 Esophagitis, gastroent &		44
15.	358 Uterine & Adnexa Proc f		43
16.	138 Cardiac Arrhythmia & co		39
17.	204 Disorders of Pancreas		37

Appendix J
(1999 DHCS High Cost DRG Comparisons)
DHCS/NNMC

DRG	Dispositions	ALOS	Direct Cost Per Disp	Support Cost Per Disp
126	2/2	**25/7.5**	**$23,532/$4,849**	**$22,783/$5,637**
13	1/1	**15/1**	**$14,119/$564**	**$13,670/$854**
287	2/3	14/11	$12,035/$10,262	$9,948/$10,370
148	12/55	8/13	$9,415/$15,556	$4,710/$14,104
398	1/22	**10/5**	**$9,413/$2,209**	**$9,113/$3,676**
193	1/5	8/11	$9,090/$11,779	$2,963/$10,656
196	1/0	12/0	$8,515/0	$6,777/0
273	1/3	**9/2**	**$8,471/$1,491**	**$8,202/$1,947**
415	9/27	7/8	$7,540/$9,250	$4,007/$7,679
478	1/18	4/7	$7,406/$6,987	$4,397/$5,436
150	3/13	8/13	$7,324/$17,914	$4,997/$14,956
164	7/3	8/4	$7,214/$6346	$4,254/$5,928
444	2/1	**7.5/4**	**$7,060/$2,963**	**$6,835/$2,540**
154	1/18	3/8	$6,926/$13,070	$2,685/$9,568

Glossary

Acetaminophen: The generic name for a common nonprescription medication useful in the treatment of mild pain or fever. This is called paracetamol in the UK.

Acupuncture: Pricking with a needle; a needle prick. Specifically, the insertion of needles into the living tissues for remedial purposes.

acute : Short in duration, brief.

acute pain : A pain that is particularly sharp or of severe quality.

AHA: American Hospital Association.

algorithms: A procedure consisting of a sequence of algebraic formulas and/or logical steps to calculate or determine a given task

AMA: American Medical Association.

AMEDD: Army Medical Department.

Anesthesia: Loss of normal sensation or feeling. A drug used to produce anesthesia

Anomaly: A marked deviation from the normal standard, especially as a result of congenital defects

Asthma: A disease process that is characterised by paradoxical narrowing of the bronchi (lung passageways) making breathing difficult.

Treatment includes bronchodilators which are given orally or delivered as an aerosol (inhaled). Corticosteroids are reserved for more difficult cases.
Symptoms include wheezing, difficulty breathing (particularly exhaling air) and tightness in the chest. Factors which can exacerbate asthma include rapid changes in temperature or humidity, allergies, upper respiratory infections, exercise, stress or smoke (cigarette).

Biofeedback: A process in which a person learns to influence reliably physiologic responses of two kinds: those that are not ordinarily under voluntary control or those that ordinarily are easily regulated but for which regulation has broken down because of trauma or disease.

A process that uses instrumentation to give a person immediate and continuing signals of change in his bodily function of which he is usually unaware.

Cauda equina syndrome: A clinical syndrome characterised by dull pain in the lower back and upper buttock region, analgesia in the buttocks, genitalia (or thigh), accompanied by a disturbance of bowel and bladder function.

CEIS: Corporate Executive Information System.

Chronic : A condition that has been, or will be, around for a relatively long time.

Clinical protocols: Precise and detailed plans for the study of a medical or biomedical problem and/or plans for a regimen of therapy.

Coccyx: The last bone of the spinal column, sometimes referred to as man's vestigial tail. The last portion of the vertebral column just below the sacrum

CPG: Clinical Practice Guideline.

Cumulative trauma disorders: Harmful and painful condition caused by overuse or overexertion of some part of the musculoskeletal system, often resulting from work-related physical activities. It is characterised by inflammation, pain, or dysfunction of the involved joints, bones, ligaments, and nerves.

DA: Department of the Army

Degenerative: Undergoing degeneration: tending to degenerate, having the character of or involving degeneration, causing or tending to cause degeneration

diabetes : (di"ah-be'tez) A general term referring to disorders characterized by excessive urine excretion (polyuria).

Diagnosis: The determination of the nature of a case of disease

Disease: An alteration in the state of the body or of some of its organs, interrupting or disturbing the performance of the vital functions, and causing or threatening pain and weakness; malady; affection; illness; sickness; disorder; applied figuratively to the mind, to the moral character and habits, to institutions, the state, etc

Diskectomy: Excision, in part or whole, of an intervertebral disk. The most common indication is disk displacement or herniation. In addition to standard surgical removal, it can be performed by

percutaneous diskectomy (diskectomy, percutaneous) or by laparoscopic diskectomy, the former being the more common.

DOD: Department of Defense

Electromyography: A test which measures muscle response to nerve stimulation. Used to evaluate muscle weakness and to determine if the weakness is related to the muscles themselves or a problem with the nerves that supply the muscles.

Abnormal results may be seen in myasthenia gravis, polymyositis, carpal tunnel syndrome, amyotrophic lateral sclerosis, alcoholic neuropathy, cervical spondylosis, dermatomyositis, familial periodic paralysis, Guillain-Barre syndrome, Lambert-Eaton syndrome, Friedreich's ataxia, mononeuritis multiplex, peripheral neuropathy, sciatic nerve disease and a variety of peripheral nerve disorders.
Acronym: EMG

Epidemiology: The study of the distribution and determinants of health-related states and events in populations and the control of health problems, the study of epidemic disease.

Ergonomics: The study of the proper and efficient use of the body in work and recreation, including the design and operations of machines and the physical environment.

Etiology : The cause or causes or origin of a disease.

Evidence-based medicine: The process of systematically finding, appraising, and using contemporaneous research findings as the basis for clinical decisions. Evidence-based medicine asks questions, finds and appraises the relevant data, and harnesses that information for everyday clinical practice. Evidence-based medicine follows four steps: formulate a clear clinical question from a patient's problem; search the literature for relevant clinical articles; evaluate (critically appraise) the evidence for its validity and usefulness; implement useful findings in clinical practice. The term "evidence based medicine" (no hyphen) was coined at mcmaster medical school in canada in the 1980's to label this clinical learning strategy, which people at the school had been developing for over a decade.

Guideline: A set of statements, directions, or principles presenting current or future rules or policy. Guidelines may be developed by government agencies at any level, institutions, organizations such as professional societies or governing boards, or by the convening of expert panels. The text may be cursive or in outline form, but it is generally a comprehensive guide to problems and approaches in any discipline or activity. This concept relates to the general conduct and administration of health care activities rather than to specific decisions for a particular clinical condition. For that aspect, practice guideline is available.

Haematoma: A localised collection of blood, usually clotted, in an organ, space or tissue, due to a break in the wall of a blood vessel.

Herniated Disc: Herniation of the central gelatinous material (nucleus pulposus) of an intervertebral disc through its fibrous outer covering (annulus fibrosis).

Herniation: Bulging of tissue through an opening in a membrane, muscle or bone.

Herniation of nucleus pulposus: Focal protrusion of disc material secondary to rupture of annulus fibrosus confined within the posterior longitudinal ligament location: L4/5 (35%); L5/S1 (27%); L3/4 (19%); L2/3 (14%); L1/2 (5%); thoracic spine affected in 3:1000 disc operations, posterolateral (49%): weakest point (posterior longitudinal ligament tightly adherent to posterior margin of disc), posterocentral (8%), lateral/foraminal (less than10%), intraosseous/vertical (14%): Schmorl node, extraforaminal/anterior (29%): commonly overlooked, bilateral: on both sided of the posterior ligament findings: disc (low T1) displaces posterior ligament/epidural fat (high T1), enlarged (edematous) nerve root: trumpet sign, see: degenerative disc disease extradural mass

Holistic health: Health as viewed from the perspective that man and other organisms function as complete, integrated units rather than as aggregates of separate parts.

Hyperlipidaemia: A general term for elevated concentrations of any or all of the lipids in the plasma, such as cholesterol, triglycerides and lipoproteins.

Hypertension: Persistently high arterial blood pressure. Hypertension may have no known cause (essential or idiopathic hypertension) or be associated with other primary diseases (secondary hypertension).

This condition is considered a risk factor for the development of heart disease, peripheral vascular disease, stroke and kidney disease.

Hypothyroidism: A deficiency of thyroid activity. In adults, it is most common in women and is characterised by decrease in basal metabolic rate, tiredness and lethargy, sensitivity to cold and menstrual disturbances. If untreated, it progresses to full blown

Injection: The act of forcing a liquid into a part, as into the subcutaneous tissues, the vascular tree or an organ

JCAHO: Joint Commission on Accreditation of Healthcare Organizations.

LBP: Low Back Pain

Lumbago: Pain in the lumbar region.

Lumbar: Pertaining to the loins, the part of the back between the thorax and the pelvis

Lumbosacral: Of or pertaining to the loins and sacrum; as, the lumbosacral nerve, a branch of one of the lumber nerves which passes over the sacrum.

Magnetic resonance imaging : (MRI) A medical diagnostic technique that creates images of the body using the principles of nuclear magnetic resonance. An MRI can generate thin-section images of any part of the body from any angle and direction, without surgical invasion and in a relatively short period of time. MRI is preferred for diagnosing most diseases of the brain and central nervous system. MRI scanners provide equivalent anatomical resolution and superior contrast resolution to that of X-ray computerized axial tomography (CAT) scanners. They produce functional information similar to that of positron emission tomography (PET) scanners but with superior anatomical detail. MRI scanners also provide imaging complementary to X-ray images because MRI can distinguish soft tissue in both normal and diseased states. Although an MRI scan is relatively expensive, it may actually reduce costs to patients and hospitals by providing diagnostic evaluation to outpatients and thereby frequently limitingmore expensive hospitalization. Because it does not use ionizing radiation, MRI is risk free except for patients with cardiac pacemakers, patients who might have an iron filings next to their eyes (for example, sheet metal workers), patients with inner ear transplants, and patients with aneurysm clips in their brains.

Manipulation: Manual treatment for symptomatic relief and functional improvement of the musculoskeletal system.

MHS: Military Healthcare System.

MTF: Military Treatment Facility

Musculoskeletal diseases: Diseases of the muscles and their associated ligaments and other connective tissue and of the bones and cartilage viewed collectively.

Myelopathy: Any disease affecting the spinal cord

Neuritis: Inflammation of a nerve, a condition attended by pain and tenderness over the nerves, anaesthesia and paraesthesias, paralysis, wasting and disappearance of the reflexes. In practice, the term is also used to denote noninflammatory lesions of the peripheral nervous system.

If the involvement is in one nerve it is called mononeuritis, in several nerves, mononeuritis multiplex, if diffuse and bilateral, polyneuritis.

Outcome and process assessment: Evaluation procedures that focus on both the outcome or status (outcome assessment) of the patient at the end of an episode of care - presence of symptoms, level of activity, and mortality; and the process (process assessment) - what is done for the patient diagnostically and therapeutically

Parameter: A variable whose measure is indicative of a quantity or function that cannot itself be precisely determined by direct methods, for example, blood pressure and pulse rate are parameters of cardiovascular function and the level of glucose in blood and urine is a parameter of carbohydrate metabolism.

Physical therapy: A physical therapist is a specialist trained using exercise and physical activities to condition muscles and improve level of activity. Physical therapy is helpful in those with physical debilitating illness (for example stroke).

Preventive medicine: Medicine designed to avert and avoid disease. Screening for hypertension and treating it before it causes disease is good preventive medicine. Preventive medicine is a proactive approach

Procedure: A series of steps by which a desired result is accomplished.

Origin: L. Procedere, from pro = forward, cedere = move

Process: Change from one state to another

Protocol : An explicit, detailed plan to deal with a case of disease.

Psychogenic: Produced or caused by psychic or mental factors rather than organic factors

Radicular: Of or performance to roots, or the root of a plant.

Radiculitis: Inflammation of the root of a spinal nerve. The latin radix means root.

Recover: 1. To regain health after sickness; to grow well; to be restored or cured; hence, to regain a former state or condition after misfortune, alarm, etc.; often followed by of or from; as, to recover from a state of poverty; to recover from fright.

Remission : The slowing down, or stopping, of the symptoms of a disease; the period during which slowing down or stopping occurs.

Repetitive Motion Injury – musculoskeletal injuries that result from repetitious movements over a long period of time (also called cumulative trauma disorders or repetitive strain injuries).

sacroiliac joint: The joint between the sacrum and ilium and associated ligaments.

Sacrum: The triangular-shaped bone lying between the 5th lumbar vertebra and the coccyx (tailbone). It consists of 5 vertebrae fused together and it articulates on each side with the bones of the pelvis (ilium), forming the sacroiliac joints.

Sciatica: A syndrome characterised by pain radiating from the back into the buttock and into the lower extremity along its posterior or lateral aspect and most commonly caused by prolapse of the intervertebral disk, the term is also used to refer to pain anywhere along the course of the sciatic nerve.

Sciatic nerve: A nerve which originates in the lumbar and sacral spinal cord (l4 to s3) and supplies motor and sensory innervation to the lower extremity. The sciatic nerve, which is the main continuation of the sacral plexus, is the largest nerve in the body. It has two major branches, the tibial nerve and the peroneal nerve.

Scoliosis: A congenital lateral curvature of the spine.

Spinal stenosis: An abnormal narrowing of the spinal canal that may be either congenital or acquired. Treatment is generally surgical to widen the spinal canal. Laminectomy may be the indicated surgical procedure to reduce pressure on the spinal cord

Spondylolysis: Dissolution of a vertebra, especially the pars interarticularis.

Sprain: A tearing injury to ligaments. Sprains can be minor, with only a slight stress to the ligament or may be severe with total separation of a ligament that supports a joint.

Sprain (knee joint): Any injury to one of six different ligaments which stabilise the knee joint. Those ligaments include: medial and lateral collaterals, medial and lateral meniscus and the anterior and posterior cruciate ligaments. Knee sprains are characterised by knee pain, swelling and tenderness with range of motion. Severe sprains may result in a knee joint effusion (blood inside the joint). Completely torn ligaments may require surgical repair to reestablish knee joint stability

Strain: A tearing injury to muscle. Usually causes some degree of bleeding within the muscle tissue (haematoma).

Surgery: Any methodical action of the hand, or of the hand with instruments, on the human body, to produce a curative or remedial effect, as in amputation, etc. Calculus of operations.

Systemic : Pertaining to a whole body rather than one of its parts.

Thoracic: Pertaining to or affecting the chest.

Ultrasound: A type of imaging technique which uses high-frequency sound waves.

This is highly operator-dependent and is thought to be useful in diagnosis but not particularly accurate in the assessment of tumor response. For the latter, CT or MR imaging are more accurate.

VA: Veteran's Administration